

INTERNET PRIVACY: HOW TO BEAT BIG BROTHER, P. 62

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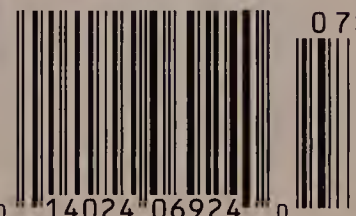
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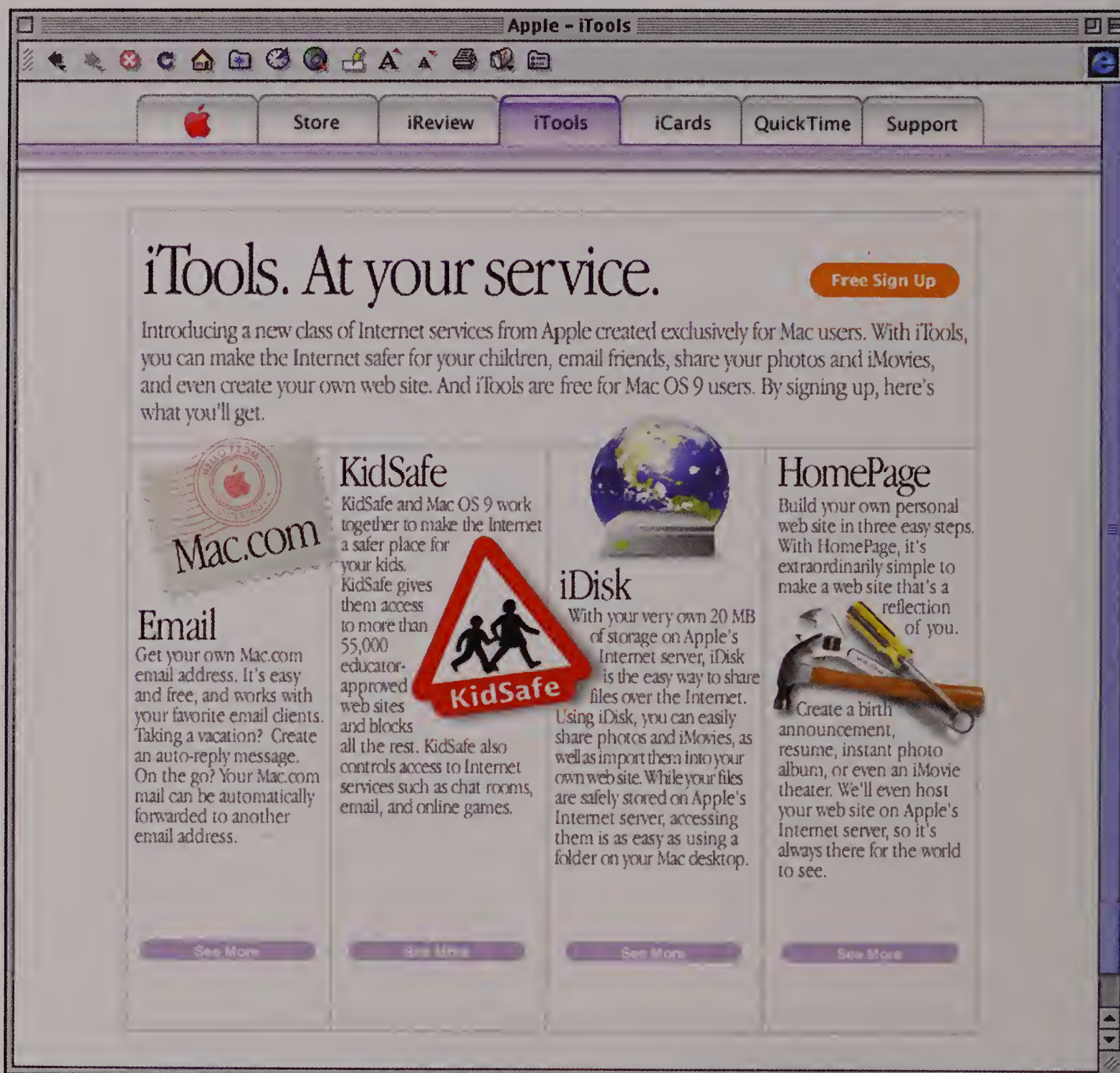
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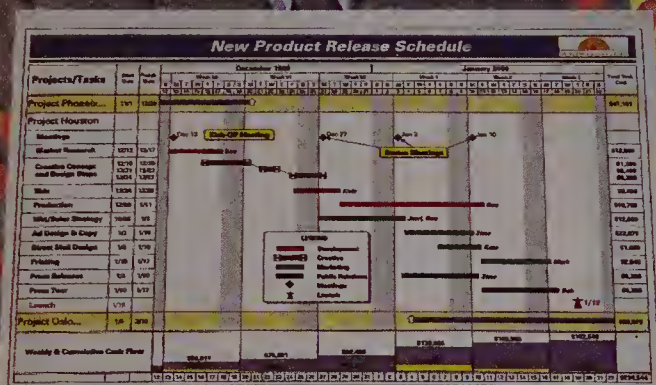
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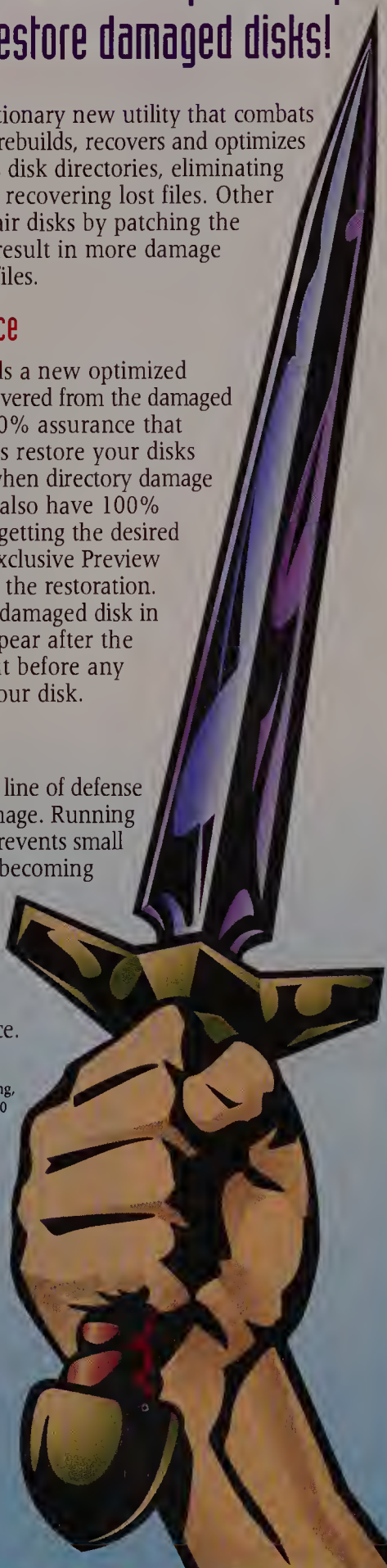
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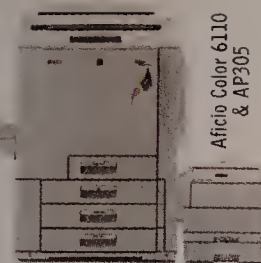
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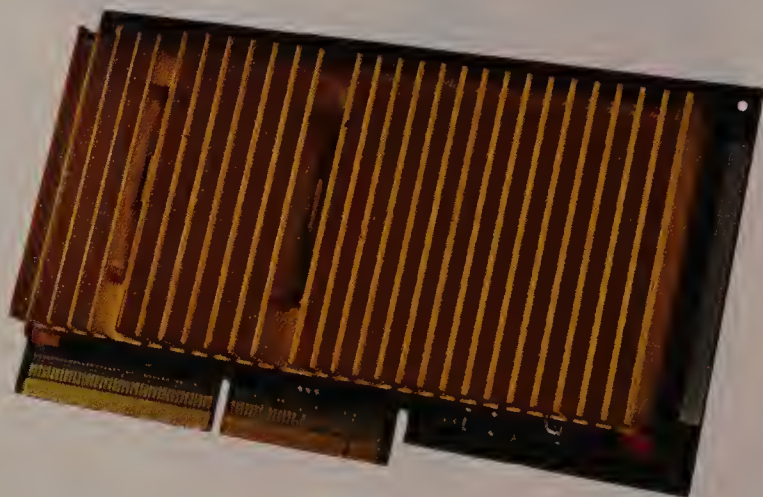
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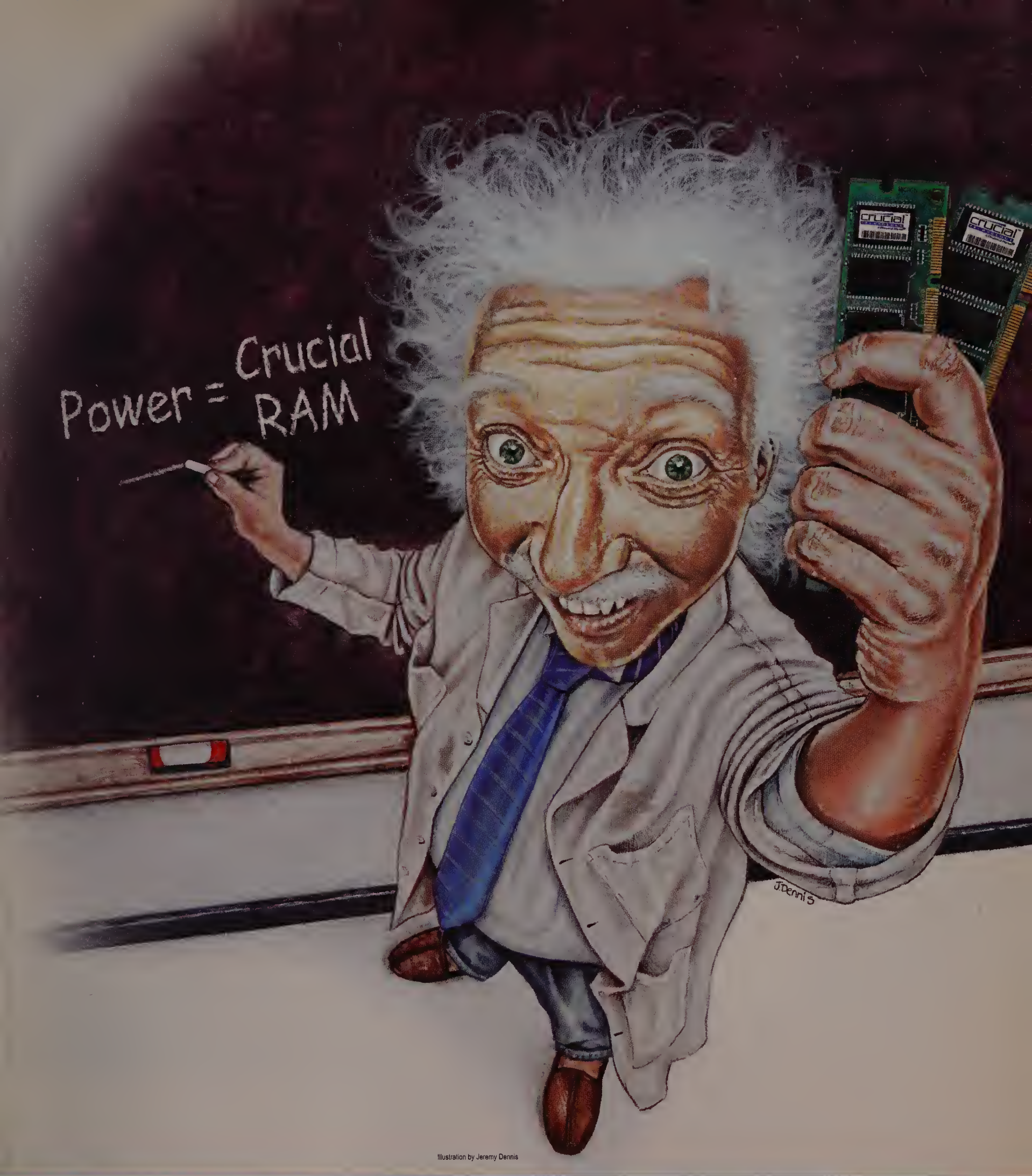


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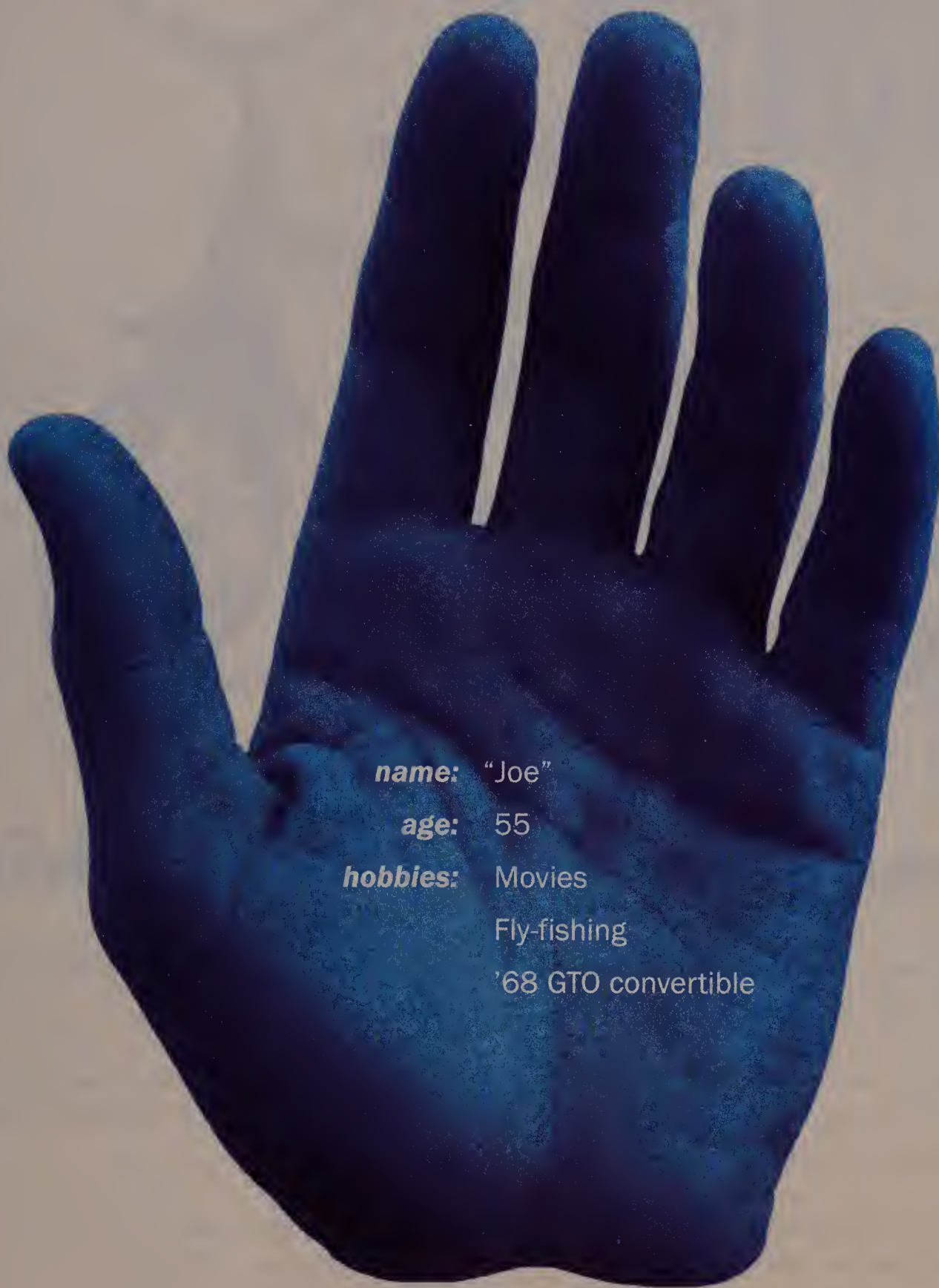
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The secret lives of Mac users and Microsoft products*

confession#

054

■ *"I've been a Mac user since the beginning. When I caught my son using Microsoft® Internet Explorer 5, I accused him of abandoning the faith. Then I tried it. I'm overcoming the guilt much faster than expected."*



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age: 55

hobbies: Movies

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J U L Y 2 0 0 0

Letters

Who Needs iMovie?

AFTER READING "HOME-MOVIE Magic" (April 2000), I wanted to add some points. I agree that Apple did not put enough thought into iMovie's sound capabilities. The program lacks the ability to control levels and to mix two audio tracks. Still, Jim Heid should not have stressed these omissions. To its credit, iMovie is not a full-fledged digital video editor; it does a satisfactory job of letting novices try video editing.

I just wish Apple would sell iMovie to users whose systems and needs are compatible with this entry-level program. Forcing users to buy either a new iMac DV or a third-party product is not much of a choice.

MIKE FLYNN
Indianapolis, Indiana

WHEN I BEGAN READING YOUR review of digital video camcorders ("Camcorder Casting Call," April 2000), I was excited and hoped your coverage would be balanced and unbiased. However, I was disappointed by *Macworld's* subpar coverage of this important emerging technology.

You manage to review three models by Sony, and you pick one of them as your Editors' Choice. Yet you reviewed only one model each from Canon and Panasonic. I just leased a Canon Ulitura camcorder and find it superior to your Editors' Choice in many ways—not the least of which is its much lower price for slightly better performance.

Those manufacturers' product lines are more diverse than you present them, with several models that might fit into the indiscernible criteria you used for your selection process.

Perhaps *Macworld* can write a follow-up article that is more carefully

researched, reviews more models, and has a more logical evaluation process.

MIKE PETERSON
Tucson, Arizona

We sent our criteria to the manufacturers, and we tested the models they sent us. Check our Web site, www.macworld.com, for reviews of more camcorders as they arrive in Macworld Lab.—Ed.

Leaving AOL

I ENJOYED READING ADAM C. ENGST'S article "E-mail for Everyone" (April 2000), but I feel that the article missed covering a large group of people: the disillusioned America Online masses. After a good many years of disappointments with the service, I intend to leave AOL for another service provider. However, I can't import my AOL 4.0 address book into Microsoft Outlook Express 5.0.1. Is there any way to do this? Claris EMailer can import addresses from AOL, but only up

through AOL version 2.7. AOL 4.0 has no export capability of any kind, and who knows if AOL 5.0 can do this? I'd appreciate any help you could offer. Retyping my entire address book doesn't sound fun at all.

LENN HANN
Naperville, Illinois

Try a free utility, AOL 3.0 Address Extractor, available at <http://asu.info.apple.com/swupdates.nsf/artnum/n10057>. It works with AOL 4.0 and can move addresses to EMailer 2.0. And there's another free utility, EMailer2Eudora, available at www.vivaladata.com/downloads/emailer2eudora.sea.bqx, that moves addresses into Eudora.—Adam C. Engst

Virex Has Arrived

IN YOUR REVIEW OF NORTON AntiVirus (NAV) 6.0.1 (April 2000), you state that Dr. Solomon's Virex is in limbo. Why do you say this? I currently use Virex on my iMac, and after reading the review of NAV, I'm wondering whether I should switch programs.

PHILIP MINNITTE
Pittsburgh, Pennsylvania

After months of silence on the fate of Virex, Network Associates has released an updated version. Look for a review of Virex 6.1 elsewhere in this issue.—Ed.

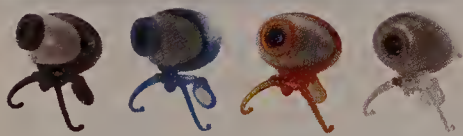
What's Faster—a G4/350 or a G4/350?

IN YOUR FEBRUARY 2000 ISSUE, YOU measured how long it took a Mac G4/350 to perform various operations ("Power Macintosh G4/400," *Reviews*). The latest issue shows similar tests for both versions (Yikes and Sawtooth), but the times are different ("Power Macintosh G4s," *continues*





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Reviews, April 2000). In some cases the February G4/350 performed better than either of the April G4/350s with a Photoshop Gaussian Blur and in SoundJam. In other tests, its performance was worse. The tests for the G3/400 also show variations. What causes the differences? Are the test files the same in all cases? I noticed that the systems tested in the February issue used OS 8.6, while those in the April issue used OS 9. Does that make a difference? Some of the variations look significant. Should we make performance comparisons only within a given test, or can we compare time performances from earlier issues, subject to the obvious caveats such as different operating systems and different amounts of RAM?

MARK V. PARIS
Rome, Georgia

The variations between the February and April scores were due to changes in the OS and updates to Adobe Photoshop and SoundJam.—Ed.

Information, Please

I AM GETTING DISAPPOINTED BY *Macworld's* brief, one-page test articles, especially for computer systems. Your tests used to be comprehensive, but now they're little more than summaries.

For instance, in the April 2000 issue, the combined test of the 350MHz and 450MHz G4 desktops contains only about 12 column inches of text ("Power Macintosh G4s," *Reviews*). While I realize these models had previously been reviewed, this is still inadequate. I'd like to know, for instance, how the DVD-RAM drive works. How does its performance compare to that of the old standard CD-ROM drive? Has Apple fixed the video-playback problems? As it is, the article provides no more information than a spec sheet and the Lab test chart.

Also, why has *Macworld* stopped publishing the standard MacBench test results for the G4s? The tests are still used for all the other models—how is a reader to compare performance across models when you use different tests for different models? What is the purpose of using the "enhanced application" performance for G4s? Why not provide both?

JAMES P. ANDERSON
Marysville, Washington

MacBench does not take advantage of the G4's Velocity Engine. For this reason, we did not

include a MacBench score. We strive to include tests that will be most useful for our readers.—Ed.

April Is the Cruellest Month

I ENJOYED JOHN RIZZO'S ARTICLE comparing Quicken MacInTax Deluxe '99 with Kiplinger TaxCut '99 Deluxe Filing Edition (*Reviews*, April 2000). Please inform your readers that for the 1999 tax year, only Kiplinger TaxCut supports older 68030 and 68040 Macs. I found this out the hard way when I ordered MacInTax, tried to start it up on my Quadra, and watched as it told me I needed a PowerPC processor. After using Kiplinger TaxCut, I found my experience was similar to Rizzo's.

JAMES HANRIHAN
North Port, Florida

Killer Gaming Machine

I WANT TO THANK CHRISTOPHER Breen for his latest column ("Hot-Rod Your Mac," *The Game Room*, April 2000). I'm not much of a gamer, but his step-by-step instructions inspired me to yank the standard-issue IDE hard drive out of my beige G3 and replace it with a new one—a very fast IBM EIDE 7200-rpm, 2GB hot rod with a 2MB buffer—for a mere \$199.

CHRIS ROSE-MERKLE
Ashland, Oregon

Sharpen Away

DAVID BLATNER WROTE A CLEAR, accurate column on the sharpening tools in Adobe Photoshop ("Sharper Images in Photoshop," *Create*, April 2000). I would just like to correct one statement.

He mentioned in passing that there is no way to bring an out-of-focus original back into focus. In fact, advanced optical processing software—which runs on Unix and similar platforms—can correct for defocus by a convolution process. In brief, the software can analyze a blurry image and figure out what sort of blur pattern the out-of-focus camera produced when it captured the image. The software can then use this information to recover an in-focus image.

I will grant that Photoshop doesn't have this capability, and that this type of

optical software is rather expensive. But focus—and other aberrations—can be corrected digitally.

CARL WITTHOFT
Acton, Massachusetts

Eat Crow

WHILE DAVID POGUE'S ANALYSIS of the Macintosh rumor mills ("Reality Check 2000," *The Desktop Critic*, April 2000) was largely right-on, he seems to have overlooked the one source that made the most accurate long-term prediction I know of to date: *Macworld*. Flipping through a pile of back issues, I came across Guy Kawasaki's November 1994 column on the very same back page of *Macworld*. He jokingly predicted that Apple would acquire Next and use its technology for a next-generation Mac, and even that Steve Jobs would return as CEO. That's some crystal ball you must have—with six-year accuracy, perhaps your publication should begin a rumor mill of its own.

JOSEPH ENGEL
Baltimore, Maryland

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CORRECTIONS

In "E-mail for Everyone," (April 2000) we incorrectly stated that Bare Bones Software's Mailsmith uses a single database to store mail. Mailsmith uses multiple databases, one per mailbox.

Contrary to our statement in a review of FontAgent 8 (Reviews, April 2000), you can use the program to copy fonts while keeping them in their original locations, by clicking on the option Don't Move Existing Fonts in the Problem Font Options window. Macworld's rating for the program remains the same.

We incorrectly referred to DropStuff as free software ("StuffIt Deluxe 5.5," Reviews, April 2000); it is a \$30 shareware product. **m**



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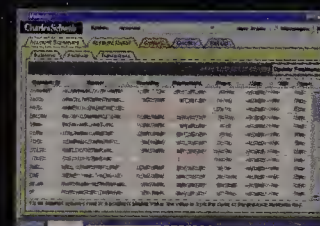
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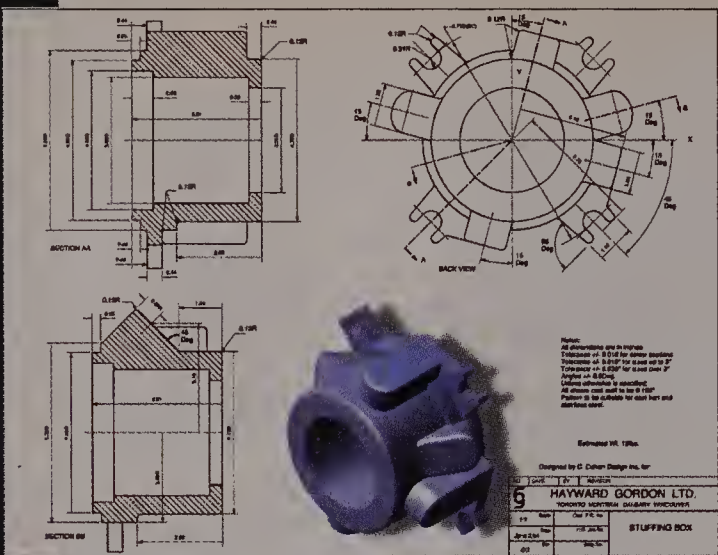
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Charles Schwab

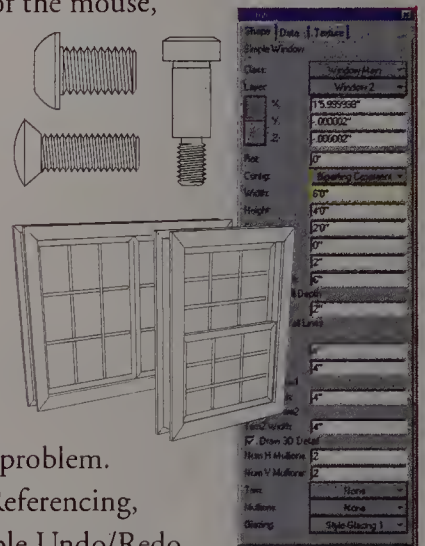


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The Vision Thing

by Andrew Gore

Never Say Never Again

TODAY'S HANDHELD GADGETS MAY GIVE US THAT 007 FEELING—BUT WHERE'S APPLE?

DO YOU EXPECT ME TO talk?" asks James Bond as he's strapped on a table, staring down a laser-beam contraption with a steely eye. "No, Mr. Bond," says the evil Goldfinger, standing over him, "I expect you to die!" So goes one of the most famous movie exchanges of all time from one of the most enduring movie franchises of all time, James Bond.

It seems these days we're all living in a James Bond movie, or at least getting our toys directly from Q: our gadgets are getting smaller, more powerful, and, yes, even more far-fetched. Who would have thought just a few years ago that we'd have handheld organizers that not only track meetings but also play music, take photos, and tell you—down to a couple of feet—exactly where you are on the planet?

But even as our toys become spy-tech, the way we interact with those devices remains low-tech . . . just like 007, who's still more or less a '50s kind of guy, despite the complexities of this modern world.

M may consider 007 "a sexist, misogynist dinosaur, a relic of the Cold War," but his gadgets are really *cool*. You know that Bond's shiny Rolex does more than tell the time—and you know that the Palm can do more than track to-dos.

On Her Majesty's Secret Service

Bond: *Have I ever let you down?*

Q: *On numerous occasions.*

What's making people excited about these handheld devices is the potential to turn them into digital Swiss army knives. That Bond-inspired lust for a combination pen/laser/Cuisinart is what's behind Handspring's attachment slot, the Palm VII's built-in wireless Internet connection, and even the arrival of the color-screened Palm IIIc.

It's not enough that our palmtop computers help us keep track of our

schedule, contacts, and to-dos—now they can let us do e-mail, browse the Web, examine spreadsheets, buy stock, track our diets, play games, receive pages, connect to GPS satellite systems, and see into the future. (OK, the last one hasn't been announced—not yet, anyway.)

Is the Palm really the best place to do this kind of stuff? I don't know about you, but I don't find the idea of surfing the Web on a screen the size of a playing card any more compelling than the idea of doing it from the screen of my cell phone.

There is, however, the convenience factor: I could make a case where grabbing my e-mail from my Palm while I'm



on the train would be useful. True, wireless communication is hardly pervasive, and even when it does work, it's expensive and slow, but, gee, it *might* work, and that would be cool!

You Only Live Twice

Bond: *My name is . . .*

Mr. Big: *Names is for tombstones, baby.*

So, what about Apple? The company tried its hand in the palmtop arena once before. And the Newton was in many ways a much better product than the one Palm makers are selling today. It had a

much more intuitive interface, it could link data between applications automatically, and its handwriting recognition didn't require users to learn special glyphs to enter data.

So, if Newton was all these things, why did it fail? It can be summed up thus: It's the size, stupid!

Well, maybe it's the size and price, both of which the Newton MessagePad 2000 offered in jumbo proportions. The Palm had the clear advantage in both these areas, yet was extensible enough to graft on functionality. And it won.

Why, then, would Apple consider reentering a market that had it running for cover just a few years ago? Simple: Apple has learned a lot in the last few years. It knows how to capitalize on other companies' successes. And it knows how to build a sexy product.

Imagine a Palm OS device with an Apple logo, an iMac's design panache, and a Newton's usability. Don't scoff: there's nothing so magical about the Newton platform that key elements couldn't be ported to the Palm. I know this because the inventor of the Palm OS took the same NewtonScript class I did.

Believe me, it wouldn't be that hard for Apple to port its handwriting recognition technology to the Palm and build an interface overlay like Windows over DOS. Done right, Apple could conserve compatibility with the vast array of Palm add-ons and increase its usability and desirability tenfold.

I don't know if the Apple Palm rumors are true, but I sure hope they are. Combine the Palm's Bondian gadget arsenal with Apple's interface acumen, and the results could be World dominating.

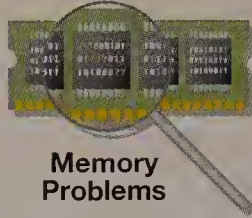
Blofeld would approve. **m**

Shaken and not stirred? Send your comments to visionthing@macworld.com.

The Seven Deadly Macintosh Sins:



Software Conflicts



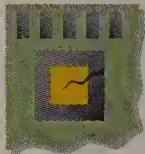
Memory Problems



Viruses



Damaged Software



Hardware Problems

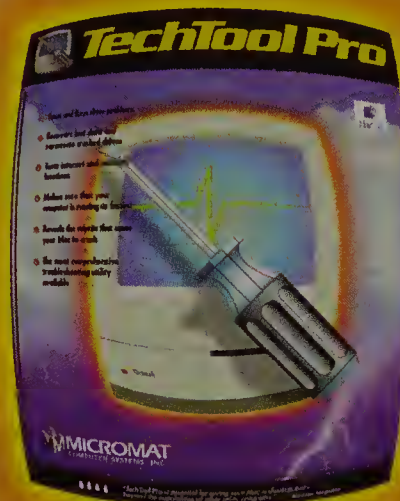


Network Problems



Disk Damage

Salvation:



When good Macs go bad and fall from grace, it's good to know there's help nearby. Salvation is only a mouse-click away with the new TechTool Pro 3. Now featuring virus protection and conflict detection, TechTool Pro is the only program you need to help abolish the evil forces that have possessed your Macintosh. TechTool Pro 3 checks more aspects of your Macintosh than any other utility available. Period. Besides repairing and recovering damaged drives, eradicating viruses and catching the occasional software conflict; you can also test all those other critical parts of your system that other utilities simply ignore. Like RAM, logic board components, floppy drives, scanners, modems, internet connections and so much more. TechTool Pro even supports technologies like System 9.0.1, "Pure" HFS+, Firewire and USB drives, and all of the latest Macintosh models.

TechTool Pro can also help you in between times of trouble. Our disk and directory optimize features can help

improve the performance of your Macintosh as well as help circumvent problems before they happen. The TechTool Protection control panel will regularly check your system so you don't have to. It will also back up critical directory data, so if something goes wrong, you'll be up and running in no time flat.

But just because TechTool Pro is the most advanced Macintosh troubleshooting utility available doesn't mean that it has to be difficult to use. Our easy-to-use interface makes checking and fixing your Macintosh as easy as pressing one button. For advanced users, expert access allows you to control and configure TechTool Pro in almost any way you wish.

So if Macintosh troubles are turning your life into a living Hades, check out the tool of the trade: TechTool Pro. After all, you have the most powerful computer in the world. Shouldn't you be using the most powerful utility?

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online

No Truce Yet in Browser Wars

NETSCAPE 6 HOPES TO
CHALLENGE EXPLORER'S
DOMINANCE

by Philip Michaels

The browser wars may appear to be over, but don't tell that to Netscape (650/254-1900, <http://home.netscape.com>). With the release of a preview version of Netscape 6, the Web-browser maker is looking to open a new front in its battle with Microsoft.

Less than a month after Microsoft (425/882-8080, www.microsoft.com) released a Mac version of Internet Explorer 5.0 (see "Microsoft Revs Up Internet Explorer," *News*, March 2000), Netscape came out with the first preview release of its new browser. The company plans a second preview release in summer 2000. The America Online subsidiary clearly has high hopes for Netscape 6, with designs on steering users away from Microsoft's browser.

That's a tall order. Explorer reigns as the most widely used browser, with a market share of nearly 70 percent. Netscape, which once boasted a 90 percent share, has seen its hold dwindle to 30 percent.

Gearing Up Gecko Enter Netscape 6, which offers a

slimmer 5.5MB download—about half the size of Netscape Navigator 4.08's—and the new Gecko rendering engine. Gecko is expected to speed up browsing by displaying tables more quickly and resizing pages instantly. More important to Netscape and AOL, the Gecko technology can be used across multiple platforms, making it easy to power Internet devices such as the ones AOL plans to release with Gateway by the end of 2000.

Other new features in Netscape 6 include the ability

to launch searches directly from the browser tool bar. Internet Explorer 5.0 provides a similar search feature, as well as a search tab that appears on the left side of the browser window.

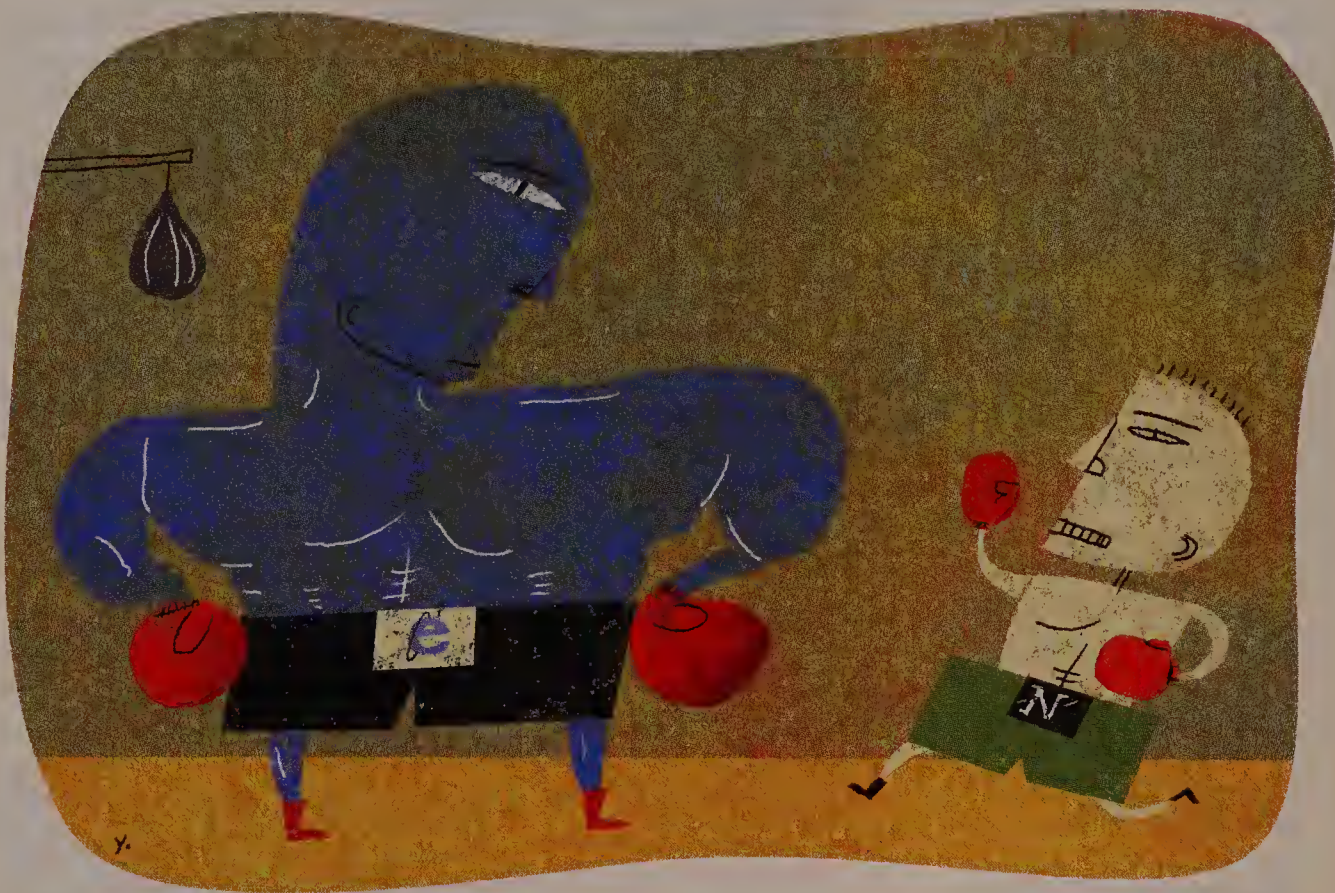
Netscape 6 also features My Sidebar, a companion browser on the left side of the Netscape screen that gives users quick access to stock quotes, news headlines, bookmarks, and other common online items. The My Sidebar minibrowser already includes more than 500 tabs from third-

party providers such as CNN, the *New York Times*, and eBay.

Users will be able to customize the appearance of Netscape 6 using the Gecko-powered Themes feature, but a customizable interface won't be available until the next preview release comes out.

Competing on Content At first look, though, what is most striking about Netscape 6 is access to a number of applications through the browser. Netscape 6 offers links to the Instant Messenger chat

continues



feature, a Netscape Mail e-mail client, and the Netscape Composer HTML-authoring tool. At the bottom of the page, users will find links directing them to Netscape-sponsored channels.

It's as if Netscape is conceding that it can't compete head-to-head with Microsoft's entrenched browser. Instead, Netscape seems to be trying to drum up customers with AOL-like services and Netscape-themed content in its new browser.

Netscape 6 still faces a formidable rival in Internet Explorer 5.0. The new Mac version of Explorer is powered by a rendering engine, code-named Tasman, that displays pages more consistently across platforms.

And it may be some time before AOL members will be able to use Netscape 6 as their browser of choice. An agreement between Microsoft and AOL makes Explorer the default browser for the online service. Although that deal expires later this year, AOL says dropping Explorer is not a sure thing.

entertainment

Judging E-books by Their Covers

FORMAT STILL HAS
HURDLES TO OVERCOME

by Frith Breitzer

Talk about your horror stories—when Stephen King released his first electronic-only book, *Riding the Bullet*, he couldn't read it on his own computer. *Riding the Bullet* was originally released in handheld-only format and

in PC-only format, for such programs as Glassbook's (781/434-2000, www.glassbook.com) Glassbook Reader. Mac users, such as King, were locked out of reading the story.



SoftBook Press's SoftBook Reader

Adobe eventually came to the rescue with a Mac-friendly version of the e-book. But the problem Mac users had getting their hands on *Riding the Bullet* only underscores the compatibility issues in a medium that promised platform independence.

Proprietary Publishing

Electronic texts in Portable Document Format were once touted as the answer to cross-platform worries. PDF files are easy to create and can be read by anyone with a copy of Adobe's (800/833-6687, www.adobe.com) free Acrobat Reader. But now some electronic publishers are promoting their own proprietary file types, viewable only with their own readers—either programs that run on your desktop or stand-alone devices.

Still, electronic books may seem like a boon to established writers looking for new audiences. And for new writers, e-books can be an inexpensive way to break into the highly competitive publishing market.

But is there really a market for electronic-only texts?

Although they have their fans—more than 500,000 readers have downloaded *Riding the Bullet*—electronic texts have not yet won wide consumer acceptance. Many e-books, including King's latest, are write-protected and copy-protected so that readers cannot alter them—or even print them out. This leaves two options: read the text on a computer screen or on a portable electronic device. And handheld e-book devices don't come cheap.

Literary Limits

While devices such as NuvoMedia's (877/776-2538, www.rocket-ebook.com) Mac-compatible \$269 Rocket eBook Pro offer large storage capacity and long battery life, the format still has some limitations. Many electronic texts are more expensive than paperback editions of the same book. What's more, published e-books are vastly outnumbered by the print versions available at bookstores or online. That's not likely to change until publishers feel more secure about their ability to protect copyrighted material in digital format.

Other e-book devices include SoftBook Press's (650/620-4100, www.softbook.com) \$600 SoftBook Reader, which bypasses computers by plugging directly into a phone line to download books. Everybook (717/939-3995, www.everybook.net) plans to offer its EB Dedicated Reader—which features a built-in modem—during the fourth quarter of 2000; the device will cost between \$1,600 and \$2,000 and target professionals such as lawyers,

engineers, and architects.

The problem? Different e-book devices use different proprietary formats. If one company gets the electronic rights to a book, other companies' devices or programs may not be able to read that particular format.

multimedia

Is Apple Going Hollywood?

NEW PRODUCTS HERALD
STRONG FOCUS ON
DIGITAL VIDEO

by Philip Michaels

No one's donning dark sunglasses or ducking out of project meetings to attend gala premieres. And Steve Jobs hasn't been spotted talking on his cell phone with his agent, demanding to meet with Scorsese. But it's pretty apparent that Apple (800/692-7753, www.apple.com) has movies on the brain.

The proof? A spate of product launches scheduled throughout 2000 that bolsters Apple's offerings on the desktop-video front.

Moving Pictures Apple sees desktop video as the next big thing in personal computing—and as natural a fit for the Mac as desktop publishing has always been. The strategy that worked so well in that medium will also guide the company's video efforts: develop high-performance products to attract pros, while luring personal users with ease of use.

Apple's belief in the emergence of digital video took root with last year's launch of the iMac DV, a computer that came bundled with the iMovie application

entertainment

Singing the Napster Blues

FIGHT OVER MP3
SERVICE WILL AFFECT
MAC USERS

by Jonathan Seff

Chances are, you like tracking down your favorite MP3 songs on the Web and downloading them to your hard drive. But a company whose services allow you to do just that has landed in legal hot water, and the resulting dispute could have a severe impact on what you can and can't download online.

The company, Napster, offers software that allows users to search through *terabytes* (thousands of gigabytes) of music files and download them for free. Popular versions of Napster software for

is not acceptable to the Recording Industry Association of America, a music-company trade organization that has filed suit against Napster. The RIAA says it's fighting to protect the rights of recording artists, some of whom are waging their own legal fight against Napster—the heavy-metal band Metallica and rapper Dr. Dre have also filed lawsuits.

Napster insists it's done nothing wrong. A company disclaimer notes that Napster has no control over content and warns users that they're responsible for complying with all copyright laws. Napster users must also agree not to use the software to infringe on others' intellectual property.

What's in It for Mac?

Mac users have more than a sporting interest in how the legal fight shakes down. The Napster suits could determine the way that materials get distributed over the Internet in the future. A Napster loss could limit which files are available online—and how much you'd have to pay to retrieve them. A Napster win could force record companies to rethink the way they do business.

More than just the fate of MP3 files is at stake. The future of digital video could also be affected. Already, two Web sites have been blocked from

offering DeCSS, a utility that lets users break the copy protection used in DVD movies. DeCSS is the only tool that allows Linux users to watch DVDs.

Even though the Napster lawsuits have yet to go to trial, it's already clear that the digital-music market is too lucrative for record

continues



the Mac include Macster, Macstar, and Rapster—all currently in prerelease form.

Nothing is actually stored on Napster's servers. Users download files directly from one another's hard drives; Napster simply provides the interface for searching and connecting with those drives.

Napster's Nemesis That

to make digital-video editing possible right out of the box. Apple's upcoming efforts in this area will keep the emphasis on ease of use and timesaving features.

Final Cut Pro 1.2.5 should hit the shelves in May. The update, free to users of the \$999 editing software, targets professionals. Its native YUV color support allows users to edit effects in one color scheme. The upgrade also supports a 16:9 wide-screen format, so QuickTime movies can fit onto Apple's Cinema Display. With Final Cut Pro, users can also create Make Reference movies that merely point to source files instead of copying the entire file during rendering; the new process frees up disk space and saves rendering time.

Apple will join forces with Pinnacle Systems (888/484-3366, www.pinnaclesys.com) to offer a video-editing system that includes a Power Mac G4. Slated for a summer 2000 release, the product will combine Final Cut Pro with Pinnacle's Targa Ciné video board to support uncompressed standard-definition (SD) and high-definition (HD) video. A fully configured SD setup should cost less than \$10,000; the HD version should cost less than \$30,000.

Another product, the RTMac, will offer real-time editing, support for a second monitor, and real-time video playback. Apple is teaming with Matrox (800/361-4903, www.matrox.com) to produce the \$999 PCI card, which is due for release this fall. The RTMac lets users render motion with compositing, so they can plot complex movements without having to wait for an effect to render.

What's in Store For anyone who's ever wanted to get into e-commerce but is paralyzed at the thought of building a site from the ground up, Smith Micro (858/675-1106, www.smithmicro.com) offers **Web Catalog 4.0**. The \$3,495 software that shipped in May lets users build customized e-business sites without having to monkey with HTML.

Printing on the Cheap

Epson (800/463-7766, www.epson.com) has good news for anyone who balks at paying hundreds of dollars for a printer. The **Epson 670** offers 1,440-by-720-dpi resolution—and an \$89 price.

Optical Dream Come True

Mac users can't mope anymore about being shut out of Iomega's (800/697-8833, www.iomega.com) optical storage line: the PC-only external **ZipCD Universal Serial Bus CD-Rewritable Drive** now comes with a Mac driver. The 4x4x6 drive lets you store 650MB of data and costs around \$280.

Graphic Changes

ATI Technologies (905/882-2600, www.atitech.com) thinks its **Radeon 256** graphics processor will change the way you see your Mac. The chip, which should ship this summer, features 128MB of double-data rate memory at 200MHz, a 1.5-gigatexel-per-second rendering engine, and a geometry engine that reportedly offers a tenfold improvement in 3-D modeling detail over what current processors provide.—

EDITED BY FRITH BREITZER

companies to ignore. This dispute is one to keep an eye on as you build your own MP3 library.

graphics

MetaCreations Drops the Other Shoe

COREL, ADOBE BUY ORPHAN PROGRAMS

by Frith Breitzer

For MetaCreations fans who've waited to hear what would become of their favorite programs, the suspense is over. But now the real waiting begins. Corel (800/772-6735, www.corel.com) and Adobe (800/833-6687, www.adobe.com) have walked away with most of the graphics applications that MetaCreations planned to sell, leaving Mac users to wonder if all of the programs have found Mac-friendly homes.

Adobe bought the 3-D graphics programs Canoma and Carrara, and Corel purchased Painter—a Macworld Eddy award-winning natural-media painting program. Corel also snapped up Bryce, Kai's Power Tools, and KPT Vector Effects.

Corel's Intentions Few would question Adobe's commitment to the Mac market. But Corel's track record has been less than reassuring. CorelDraw 9, released for Windows in May 1999, still isn't available in a Mac version. What's more, the company has a reputation for hyping projects that don't pan out. Development of an all-Java office suite fell through, and Corel President and CEO



Scribble, Scan, and Print

COPYING NOTES FROM A WHITEBOARD ONTO PAPER is tedious. But this thankless job—and the ensuing writer's cramp—could be a thing of the past, with Brother International's (908/704-1700, www.brother.com) Copy-Point 2000 electronic whiteboard. The \$699 whiteboard includes a scanner and a printer, so you can make copies of whatever you scribble. You can mount the 32-pound Copy-Point on a wall or carry it on a transportable easel. One missing feature is sure to frost Mac fanatics—a PC link option that lets users save images to their computer isn't available for the Mac. Brother says it may add this feature in the future.—PHILIP MICHAELS

Michael Cowpland is under investigation in Canada for alleged insider trading.

Corel says it will continue to develop the MetaCreations applications and keep them as stand-alone products. It may also port the programs to the Linux platform: the company recently introduced a Linux-friendly version of its flagship office suite, WordPerfect Office 2000.

Regardless of Corel's commitment to the Mac, the company now faces a familiar challenge: working on code that was developed and mod-

ified over the years—without having the original programmers on staff.

Support Ends Soon MetaCreations will continue to support Bryce, Painter (including Painter Classic, Painter 3D, and Art Dabber), and the KPT programs until June 20, 2000.

MetaCreations' other graphics application, Poser, was bought by Egi.sys, a German company that plans to turn the program over to its California subsidiary, Curious Labs (831/462-8222, www.curiouslabs.com).

online

Making Web Tools Dynamic

ULTRADEV, DYNAMIC

LINK TIE SITES TO DATABASES

by Philip Michaels

Static Web pages don't cut it anymore. Web designers now aim for dynamic, database-driven sites that allow them to change a layout or update content without having to rebuild individual pages.

Database Connections

Enter Dreamweaver UltraDev, from Macromedia (800/470-7211, www.macromedia.com). UltraDev is tightly integrated with Dreamweaver 3. But with UltraDev, the focus is on creating database-driven applications for Web sites.

UltraDev lets designers connect a Web page to databases. It supports popular application servers using JSP, ASP, and ColdFusion. Users can view, test, and edit live data returned to their Mac from the application server, reducing the time it takes to build a Web application.

At \$599, UltraDev costs twice as much as Dreamweaver 3. (Dreamweaver 3 users can buy UltraDev for \$299; Macromedia Drumbeat users can upgrade for \$99.)

Adobe offers a similar tool: its Dynamic Link for ASP feature allows users to connect to and deliver content from any ODBC-compliant database.

Adobe first released Dynamic Link as a downloadable plug-in for GoLive 4.0.1, but the feature is built in to GoLive 5.0.

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- ***"I own a PowerMac G4 with all the trimmings. And yes, I use Microsoft® Office. Sometimes I say that just for the shock value."***



name: "Jake"

age: 28

hobbies: Snowboarding
Iguanas
Bass guitar

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Microsoft

Reviews

FreeHand 9

ILLUSTRATION PROGRAM

FANTASTIC AT FLASH,

FIZZLES ON FEATURES

PREPRESS PROGRAMS HAVE HAD a hard time making themselves relevant to Web designers. The current versions of traditional print applications Adobe Illustrator, CorelDraw, and QuarkXPress lack so much as a single Web-specific feature that another program doesn't handle more efficiently. In fact, only one application—Adobe Photoshop—has managed to gain wide acceptance among print and online professionals alike.

The latest version of Macromedia FreeHand promises to change all that. While its predecessor supplied a couple of token features aimed at creating simple Flash files, FreeHand 9 makes a convincing case for designing professional-level Web animations inside a vector-based illustration program. Although it's by no means the only program you'll need for generating online content, FreeHand 9 does something Flash doesn't—it makes the process of generating Flash objects familiar and intelligible.

Flash in the 'Hand

Just as Photoshop is a natural for creating Web imagery, drawing programs are ideally suited to vector-based SWF (Shockwave Format) content. Yet four years after that format's introduction, most illustration programs are just now jumping on board.



JOHN RITTER

Fortunately for FreeHand loyalists, their software of choice backed a winner early on. FreeHand 7 exported scalable graphics that were readable with a Shockwave player; FreeHand 8 could convert blended paths to frames in a Flash animation.

By the time you read this, Illustrator 9 will have caught up with FreeHand—version 8, that is. Meanwhile, FreeHand 9 has already leapfrogged ahead. For starters, with FreeHand 9 you can create page sizes that are geared specifically for Flash output. And FreeHand 9 lets you name and store custom page sizes. (Strangely, however, it lacks predefined Web sizes, so you'll have

to create your own 800-by-600-pixel or banner-ad setting.) You can likewise define custom units of measurement—great if you tend to work in, say, 16-by-16-pixel blocks. And for those who prefer to animate pages using layers, a new tool lets you move pages, change their orientation, or even clone them (along with their contents) directly on the pasteboard. The only drawback is the lack of a step-and-repeat function for cloning multiple pages.

FreeHand also expands its support for SWF in version 9. One new option automatically resizes and renders a Flash animation so it fills a browser window exactly,

REAL PRODUCTS
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Reviews you can trust: Macworld rates only final shipping products, not prototypes. What we review is what you can actually buy.

OUTSTANDING: ★★★★★

VERY GOOD: ★★★★

GOOD: ★★★

FLAWED: ★★

UNACCEPTABLE: ★

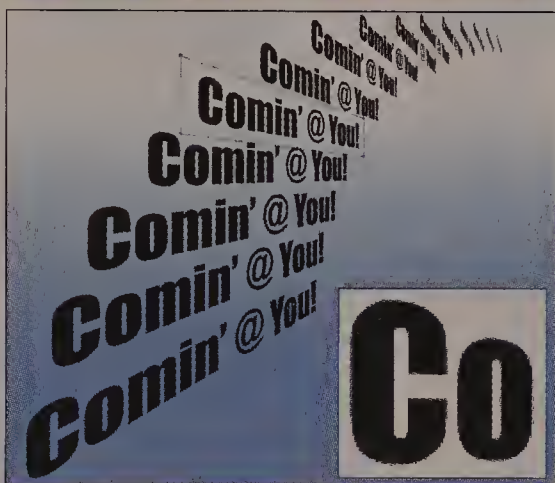
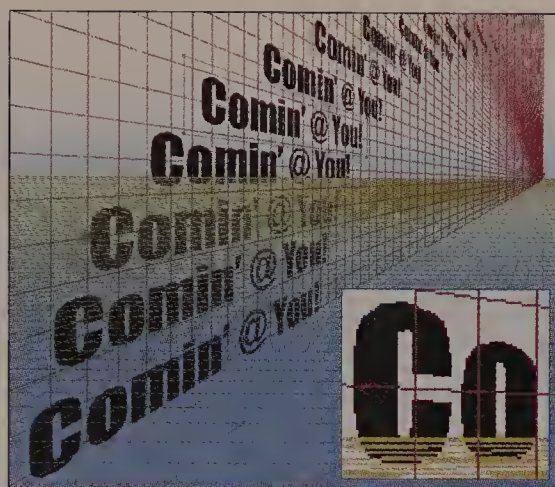
regardless of the window's size. Two other options let you control how your SWF file is used: you can safeguard your Flash files so visitors can view them but not download them, and you can specify whether the Flash 4 Player can output a file at the full resolution of the visitor's printer or only at screen resolution.

The new version gives you a way to reduce the size of a Flash file by storing repeating graphics and text objects as symbols. A Web browser needs to download the symbol just once, regardless of how many times it appears. And the use of symbols isn't limited to Web graphics: modifying a symbol causes all instances of the symbol to update—perfect for designs that involve repeating icons and page elements.

Minor Enhancements

Aside from SWF support, FreeHand 9's new features won't significantly change the way you work. First among these additions is a new perspective-grid tool that lets you simulate 3-D objects and backdrops. After establishing a grid of straight lines that converge toward one or more vanishing points, you can use the perspective tool to move the grid and adjust the speed of convergence. You can also align objects to the grid and snap them into perspective. You can even clone shapes and letters on-the-fly to create a perspective sequence; send the objects to different layers, and you have a 3-D Flash animation (see "Grids in Space"). But this feature could definitely stand some improvement. You can't step and repeat objects that are in perspective, and the method for scaling a perspective object—tapping a number key while pressing the mouse button—is both counterintuitive and shamefully inefficient.

FreeHand 9 increases the accuracy of its namesake, the Freehand tool, and makes blends more flexible by accurately translating composite paths (shapes with holes in them) and grouped objects. An expanded Transform palette lets you create multiple copies of an object while scaling or rotating it numerically, a terrific time-saver. For those who hate to shift-click, the new lasso tool lets you select points by roping them with a free-form marquee. If you want to gain more control over FreeHand's already excellent autotracing function, you can identify an area of color with the new magic-wand tool and convert the outline to a path. My favorite improvement, however, is the



Grids in Space FreeHand 9's magnetic perspective grid is handy for aligning objects in simulated 3-D space. Unfortunately, the grid invariably appears in front of objects (top). In the antialiased view, the grid vanishes entirely (bottom).

expanded enveloping feature, which lets you distort objects inside a drawing window rather than in a dialog box with a bad preview, as in FreeHand 8.

FreeHand's Funky Face

FreeHand's blend of speed and flexibility, combined with its leadership in the features arena, makes it an exceptional program by any measure. But as someone who's used the program since before it had a name, I feel I've earned the right to lament what is only becoming a clumsier and more crowded interface. Palettes are oddly sized and poorly organized; some icons are so small and badly rendered as to be unrecognizable; and dialog boxes tend to be cramped, with many option names exhibiting kerning problems, of all things.

Ugly is in the eye of the beholder; bad interface design isn't. Cross-platform differences abound, the most egregious being the absence of a context-sensitive pop-up menu in the Mac version. FreeHand 9 offers an antialiased screen display—more accurate and easier on the eyes—but it sends all grids into hiding, even though check marks in front of the grid commands

indicate that all guides are visible. Finally, the default keyboard shortcuts verge on the bizarre, and unlike Illustrator's peculiarities, they have nothing to do with cross-application homogeneity. Fortunately, you can customize the shortcuts and even assign keystrokes to specialized tasks, such as closing paths and retracting control handles. But shortcomings remain. For example, there's no way to hide all the interface folderol when you need to focus exclusively on your artwork.

If all this sounds familiar, it's because I've been raising these and similar objections for years. Macromedia representatives tell me they've made no attempt to streamline the interface because users don't complain about it. But I remember the outcry when Aldus released FreeHand 4, with its badly structured, palette-happy design. My guess is that disgruntled FreeHand users have either moved on or given up the fight.

Macworld's Buying Advice

Interface eccentricities aside, FreeHand 9's greatest failing may be its lack of a revolutionary feature to rival the groundbreaking translucency and live-effects options promised by Illustrator 9—while clearly unique, the perspective grid isn't half as cool or one tenth as useful. What saves FreeHand 9 is its continued commitment to Flash. Web designers who haven't already acquired Flash 4 can purchase Flash 4 FreeHand 9 Studio for just \$100 more than the cost of FreeHand 9 alone. There's no special integration here—it's just two CDs with two separate manuals in the same box—but the pair complement each other nicely. These days, just about every digital artist has some interest in the Web, so FreeHand's focus on Internet features is smart. But if it weren't for Flash, the best thing you could say about FreeHand 9 would be that it's bigger, busier, and brasher than ever. Problem is, those are the last things this program needs.—DEKE MCCLELLAND

RATING: ★★★½ **PROS:** Flexible page management; SWF security features; dynamic symbol library; improved autotracing and enveloping. **CONS:** Perspective grid needs work; no context-sensitive pop-up menu; increasingly cumbersome interface. **COMPANY:** Macromedia (800/457-1774, www.macromedia.com). **COMPANY'S ESTIMATED PRICE:** \$399; Flash 4 FreeHand 9 Studio, \$499.

Workgroup Printers

AFFORDABLE BLACK-AND-WHITE NETWORK PRINTING

LASER PRINTERS HAVE BECOME AS ubiquitous as the office water-cooler—and nearly as inexpensive. Even small offices and home offices can take advantage of the printing speed and quality offered by the latest generation of low-cost, Ethernet-ready laser printers.

Macworld Lab looked at six black-and-white laser printers designed for the SOHO market: Brother's HL-2060, Hewlett-Packard's LaserJet 4050N, Lexmark International's Optra T612, NEC's Superscript 1800N, Samsung's QL-7050N, and Xerox's DocuPrint N2125. These networkable laser printers retail for less than \$2,000, have paper trays that hold at least 500 sheets, and print more than 15 pages per minute (ppm). Our tests showed that, basically, you get what you pay for. The Optra T612, the most expensive of the bunch, boasted the fastest printing and the best quality; the least-expensive models, the Superscript 1800N and the HL-2060, turned in the worst performance and scored the lowest in our qualitative tests.

Controlling the Printer

When printing on a network from a Mac, you use the AppleTalk protocol, coupled with software drivers and descriptions written specifically for your printer. Lex-



Lexmark International's Optra T612 (left) and Xerox's DocuPrint N2125

mark's software package seemed the most powerful and Mac-friendly, offering additional controllers for features such as toner and color management, but the software for all of the printers we tested worked flawlessly.

All the printers offer easy-to-use controls and legible LCD screens. The Superscript 1800N and the QL-7050N are almost identical: both have adjustable, backlit LCDs that are fairly easy to use. The LCD

screens on the DocuPrint N2125 and the HL-2060, however, are so inclined that some users may find the display difficult to read if the printer is placed on a table. On the Optra T612 and the LaserJet 4050N, the LCDs and controls are on the front rather than the top and are easily accessible.

The Optra T612 presented the only real physical problem: because it offers room for expansion it's less ruggedly constructed than the others.

Workgroup Printers Compared

Company	Product	Mouse Rating	List Price	Contact	Pros	Cons
Brother	HL-2060	★★★	\$999	888/879-3232, www.brother.com	Good text quality.	Poor image quality; expensive networking option.
Hewlett-Packard	LaserJet 4050N	★★★½	\$1,519	800/752-0900, www.hp.com	Lowest printing cost per page; good print quality.	Expensive.
Lexmark International	Optra T612	★★★★	\$1,749	888/539-6275, www.lexmark.com	Fastest printer tested; superior image quality.	Expensive.
NEC	Superscript 1800N	★★★½	\$999	800/632-4636, www.nec.com	Inexpensive.	Slow; unimpressive image quality.
Samsung	QL-7050N	★★★	\$1,099	800/726-7864, http://samsung-electronics.com	Reasonably priced.	Slow; unimpressive image quality.
Xerox	DocuPrint N2125	★★★★	\$1,299	800/835-6100, www.xerox.com	Reasonable price; fast; decent quality.	Lackluster print quality at 600 dpi.

Printers Shine at Text, Struggle with Images

Best results in red. Microsoft Word 98 and Adobe Photoshop 5.5 results are in seconds.

	Word 98	Photoshop 5.5	Excel 98 Graph	Excel 98 Table	Photoshop 5.5 Image
at 600 dpi:					
Brother HL-2060	108.5	253.4	Fair	Excellent	Poor
HP LaserJet 4050N	121.0	93.1	Fair	Fair	Excellent
Lexmark Optra T612	102.7	42.3	Excellent	Excellent	Excellent
NEC Superscript 1800N	148.6	1,857.1	Poor	Poor	Fair
Samsung QL-7050N	129.9	241.5	Fair	Poor	Fair
Xerox DocuPrint N2125	104.3	64.6	Fair	Fair	Fair
at 1,200 dpi:*					
Brother HL-2060	191.6	439.2	Poor	Fair	Poor
HP LaserJet 4050N	121.1	100.7	Fair	Excellent	Excellent
Lexmark Optra T612	104.1	43.3	Excellent	Excellent	Fair
Xerox DocuPrint N2125	104.1	65.4	Excellent	Excellent	Fair

Shorter bars are better.

*The Superscript 1800N and the QL-7050N can't print at 1,200 dpi.

Behind Our Tests

We tested the printers by printing a 30-page Microsoft Word 98 document and a 17.9MB black-and-white Adobe Photoshop 5.5 image. Times were measured from the moment the print button was pressed to the moment the last page fully emerged from the printer. The test system

was a 400MHz blue-and-white Power Macintosh G3 with 128MB of RAM and Mac OS 9. The qualitative results were obtained by comparing a Photoshop 5.5 test image and an Excel 98 table and graph. —Macworld Lab testing supervised by David Read and Gil Loyola

Built for Speed

Depending on the number of users and how much printing they plan to do, print speed may be a critical factor in choosing a printer. Macworld Lab performed two timed tests to determine which printer was quickest on the draw, measuring the time each took to print a black-and-white Adobe Photoshop image and a 30-page Microsoft Word document (see "Printers Shine at Text, Struggle with Images").

When it comes to printing text at 600 dpi, the Optra T612 is the fastest, averaging 17.5 ppm. Also impressive was the DocuPrint N2125, which averaged 17.2 ppm. The slowest was the Superscript 1800N, averaging 13.3 ppm. When printing at 1,200 dpi, the heavier load bogged down all the printers. However, the Optra T612 remained the fastest in nearly all categories; its performance at 1,200 dpi was only seconds slower than at 600 dpi. The Superscript 1800N and the QL-7050N can't print at all at 1,200 dpi.

These printers are designed to output text, but they may also be called upon to print images. The Optra T612 printed our Photoshop image the fastest at 600 dpi and was the only printer to complete the task in less than a minute. The Superscript 1800N, which took more than half an hour, is clearly ill-suited for this kind of work unless you're exceptionally patient.

Print Quality

Another deciding factor is print quality. Macworld Lab looked at four common output types when reviewing the print quality of these printers: text, images, and two Microsoft Excel spreadsheets—a graph with heavy bars and a table with fine lines. The most important of these factors is text; happily, all the printers yielded superior text quality, whether we were testing for quality or speed.

Unfortunately, all the printers except the Optra T612 had some difficulties printing images and Excel files at 600 dpi. The problems were minor but noticeable: in the Excel graphs, streaking occurred when heavy black bars printed horizontally over a light gray background. This happened in areas of dramatic light and dark contrast, too. The printers also couldn't fully resolve the fine rules in the tables. At 1,200 dpi, the output from all the printers that *can* print at that resolution generally improved—particularly the output from the LaserJet 4050N, whose quality approached that of the higher-priced Optra T612.

When printing a Photoshop image at 600 dpi, the Optra T612 again gets the nod, but the LaserJet 4050N also performed exceptionally well. The problems with the other printers included overgranulation of pixels and some striping. The HL-2060 suffered from gray-scale gra-

dation problems at 600 dpi, resulting in bands of gray across the image. (Brother has a fix for this problem that involves turning off High Resolution Control, a technology designed to improve the crispness of text.) Output from all the printers (again, those that can print at 1,200 dpi) improved at 1,200 dpi, but the LaserJet 4050N did the best job with the Photoshop image.

Another consideration is the cost of toner. The LaserJet 4050N was the most economical, at 1.27 cents per page; the most expensive were the QL-7050N, at 2.24 cents per page, and the Optra T612, at 2.22 cents per page. For the HL-2060, you'll also need to figure the cost of a networking package (\$399) into the total price; the other printers are preconfigured to be connected to a network.

Macworld's Buying Advice

When comparing networkable printers for office use, you have to weigh print quality and speed against operating costs and purchase price. Lexmark's Optra T612 is expensive to buy and to run, but the result is superior performance and excellent print quality. A good compromise for those on a budget is the DocuPrint N2125, with its winning combination of speed, quality, and value. If your small or home office is ready to invest in a networkable laser printer, you can't go wrong with either one.—DAVID READ

Director 8 Shockwave Studio

DEFINITIVE MULTIMEDIA AUTHORING TOOL GETS USABILITY BOOST

MACROMEDIA DIRECTOR 8 Shockwave Studio is in a class by itself. It's the best—and only—tool for creating highly interactive multimedia projects and Shockwave movies. If you use Director to make a living, you'll appreciate the increased usability, productivity, and stability that this version offers.

But Director 8 isn't simply a productivity-enhanced upgrade to Director 7; it also adds a Publish wizard for easier Web delivery, scalable Shockwave movies that can fill the browser window, and a set of Lingo commands for controlling images and sound. If you're not yet a Director user but want to create sophisticated multimedia projects, you'll be happy to know that this is the most approachable version to date, offering a redesigned interface and libraries of reusable behaviors.

Get Productive

If you like upgrades that offer hordes of new features, Director 8 Shockwave Studio may disappoint you. What you *will* find are enhancements that make the program more usable. For example, the *stage* (Director's workspace) can now be zoomed in to position elements precisely, or zoomed out to arrange the multitude of windows you're likely to need. Director 8 also features movable guides to which you can snap *sprites* (visible objects on the stage), and you can lock sprites to avoid moving them accidentally.

Other productivity enhancements include two significant changes to Director's interface. The first involves the Cast window, where all of your media reside. Each cast member—sound, video, text, or graphic—is displayed in seemingly random order in the thumbnail view. Director 8 lets you see your cast in list view instead, so you can sort by name, number, type, or date modified. You can also sort by comments, a new property that identifies each cast member.

The second productivity boost comes from Director 8's new Property Inspector, which consolidates in a single window the tools necessary to specify how cast members appear or act (such as a box's fill color or whether a sound should loop). Previous

versions of Director required that you click on an information button to access properties; now when you select a cast member, the Property Inspector displays all the properties of that object. It's so useful that you'll probably keep it active whenever you're working in Director (though it does have a habit of obscuring other windows).

Director Works the Web

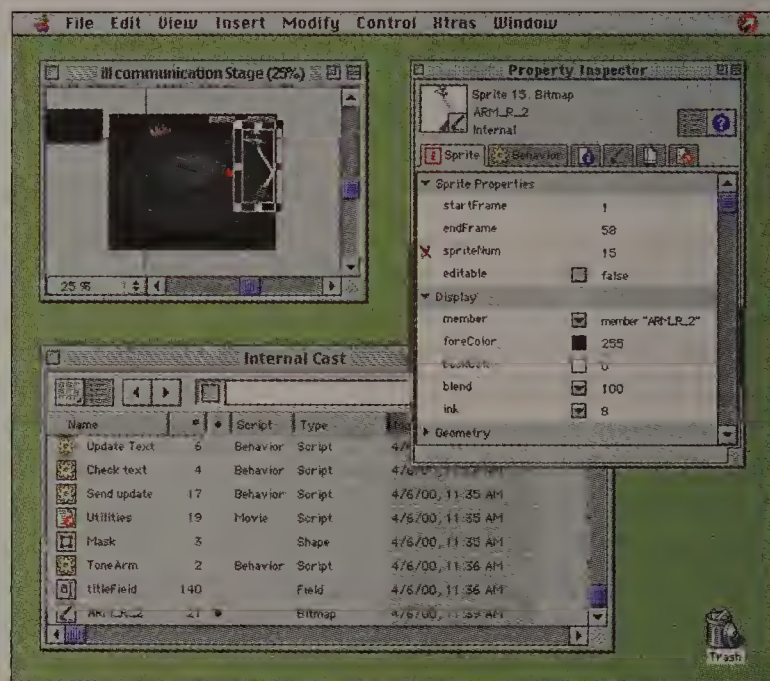
Director 8's new Publish wizard lets you specify how your movie will be delivered on the Web. You don't need to write the HTML code by hand; the wizard does that for you based on the settings you specify. Director also comes with sophisticated Publish templates, including one that automatically installs the Shockwave plug-in for your visitors, and another that keeps your visitors occupied with a video game while your movie downloads. You can modify these starter templates to suit your own needs. Once you set up the Publish settings, the Preview In Browser command allows you to see your movie in a browser with just one click.

Other Web-oriented features in Director 8 are the ability to scale Shockwave movies to fill the browser window—though you'll see some image degradation when raster graphics scale—and the option to choose the level of JPEG compression applied to images, either individually or globally. (In earlier versions, image cast members were bitmapped and uncompressed; the only way you could make those files smaller was to change their color depth.)

The downside is that to view your Shockwave movies, site visitors will need the Shockwave 8 browser plug-in (a free download from Macromedia's Web site). Unlike Flash 4, which can export files as Flash 1, 2, 3, or 4, Director 8 can produce only Shockwave 8 files.

The Power of Lingo

Director movies can be simple linear animations, or they can be more interactive—if you're willing to program the action. Director's approachable and extensible programming language, Lingo, lets novices and experts alike incorporate advanced interactivity using either an English-like syntax (as in **set the volume of sound 1 to 100**) or a dot syntax (as in **sound(1).volume=100**) that's similar to JavaScript's Document Object Model. Lingo can take a long time to master, but learning the basics is fairly easy as programming languages go.



Screen Savers Director 8 Shockwave Studio features a more approachable interface, including a new Property Inspector, a sortable Cast window (in list view), and a stage that you can zoom out to free up space.

Until you have the skills to write sophisticated scripts, you can drag and drop the new starter behaviors that come with Director 8. Its library of behaviors lets you do everything from causing a graphic to turn and face the cursor, to applying special effects one sprite at a time (instead of to the entire screen at once), to automatically posting data to a CGI script. The library not only gives novices a kick start but also helps them learn how behaviors are created.

Director's new linked-script feature keeps code separate from content; scripts are saved as text files and can be stored on a server, allowing teams of program-

mers to share code. Normally, a benefit of linked files is that you can replace a linked file at any time and your movie will reflect the change. That's not the case with linked scripts, which don't remain linked when you publish them; the linking feature works only during the development phase.

You'll also find some new Lingo commands in Director 8's repertoire, including those that control sounds. You can give your users control of the sound, or simply create dynamic audio effects for a

nections (the previous limit was 50). You also get Fireworks 3—a great program for optimizing and slicing images into HTML tables (see *Reviews*, April 2000)—and Peak LE (or SoundForge XP in the Windows version) for audio editing.

Director itself is cross-platform: when delivering movies to the Web, you don't have to create separate files for Mac and Windows users; viewers simply need the appropriate Shockwave 8 plug-in for their systems. But if you plan to deliver stand-alone applications, known as *projec-*


tors, you'll have to purchase both versions of Director. Macromedia takes some of the sting out of purchasing both versions, at least if you have earlier versions of each, by offering a \$100 rebate when you upgrade both. (The upgrade price is \$399 if you own Director 7; you can upgrade from Director 5, 6, or 6.5 for \$499.)

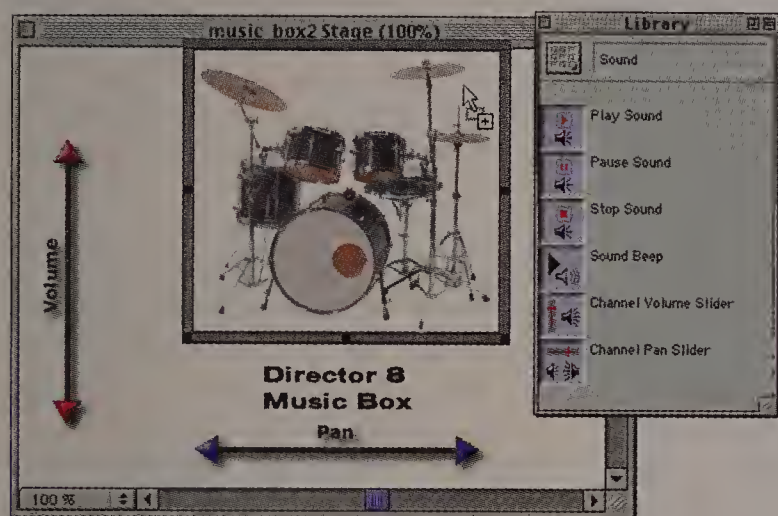
The system requirements for authoring are fairly robust, as you would expect: you'll need

at least a 180MHz PowerPC running Mac OS 8.1 or later and a minimum of 32MB of RAM dedicated to Director 8. (Viewers also need OS 8.1, unfortunately.) If you want to deliver to users with 680X0 Macs, you'll have to stick with Director 6.5.

Macworld's Buying Advice

Director 8 Shockwave Studio offers a nice mix of productivity enhancements and new features. Although there's no getting around the fact that Director projects can be difficult to create, a new library of reusable code and a redesigned interface make this version more approachable, bringing Director one step closer to perfection.—PHILLIP KERMAN

RATING:  **PROS:** More usable interface; timesaving Publish wizard; pixel-level imaging syntax; advanced audio controls. **CONS:** Shockwave movies aren't backward-compatible; scripts can be linked only temporarily. **COMPANY:** Macromedia (800/457-1774, www.macromedia.com). **COMPANY'S ESTIMATED PRICE:** \$999.



Sophisticated Sounds Director's new sound library includes drag-and-drop behaviors for controlling audio.

more realistic multimedia experience. Sounds begin playing when you tell them to (not a few milliseconds later as in previous versions), and when several sounds are stacked up to play in sequence, there are no pauses between them. You can manipulate a panning property for a stereo sound while it plays, and establish loop points within sounds dynamically.

Other new Lingo commands—known as Imaging Lingo—give you dynamic, pixel-level control of graphics. You can copy and paste portions of images, combine graphics with blended effects, and create new graphics, all at run-time. Because the graphics are created on-the-fly, file sizes stay small. These functions place demands on the viewer's computing power, but the small file sizes mean fast downloads.

Bundle Up

Director 8 Shockwave Studio is available only as a bundle with several other applications. One of those is Shockwave Multiuser Server 2.1, which lets you create multiuser games, chat programs, and other shared experiences. The new version allows up to 1,000 simultaneous con-

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Power Macintosh G4/500

AN INCREMENTAL STEP IN THE RIGHT DIRECTION

REMEMBER WHEN PRODUCTION difficulties at Motorola led Apple to knock 50MHz off every G4 system? Well, Apple has restored that 50MHz to the latest G4s, including the long-awaited 500MHz Power Macintosh G4. The jump in processor speed from last year's models, the 400MHz and 450MHz G4s (see *Reviews*, February and April 2000), may be incremental, but it makes this G4 Apple's top-of-the-line system. If the speed boost is worth \$3,499 to you, you won't be disappointed with the G4/500.

Outside, and Inside, the Box

Of course, there are other characteristics besides processor speed that differentiate the G4/500 from its slower siblings. Like Apple's other high-end models, it offers a DVD-RAM drive instead of a DVD-ROM. It also ships with 256MB of RAM standard—fine for most users, but perhaps not enough for the professionals likely to buy a \$3,499 system. Although the G4/500 is AirPort capable, it doesn't ship with an AirPort card (or even a modem, though you can add either one). Cosmetically, the G4/500 sticks with its predecessors' graphite case, the only two exceptions being more-visible (white) front buttons and a more deftly concealed AirPort antenna.

Inside, the G4/500 remains the same as slower G4 Macs with the Sawtooth motherboard. It offers two USB ports, each with

12 Mbps of throughput; three FireWire ports, two external and one internal; a fast, 27MB UltraATA66 hard disk; and a Zip drive. Like all other current desktop Macs, the G4/500 unfortunately sports only three PCI slots. The ATI Rage 128 Pro graphics



card filling the AGP slot offers strong graphics performance and features a digital video out for flat-panel displays.

The only problem with the G4/500's design is that the system comes with the same hockey-puck mouse that users have been complaining about since it was introduced. A machine intended for professional users should include an input device that offers more in the way of precision, comfort, and ergonomics.

Sweet Performance

When a new system offers only minor cosmetic changes, the processor had better shine. Fortunately, the G4/500 delivered superior performance in every test Macworld Lab threw at it (see the benchmark "The Fastest Mac—for Now"). While it shaves only about a second off each of the G4/450's times in Photoshop tests, this Mac is intended for power users who will notice those saved seconds over the course of a day's work. It's also the fastest Mac available for encoding MP3s and playing a relaxing game of Quake III.

In terms of raw power, the G4/500 is the fastest Mac for any processor-intensive application, especially Photoshop, SoundJam, and other programs optimized for the G4.

Macworld's Buying Advice

The Power Macintosh G4/500 offers only an incremental speed boost over the 450MHz G4 released last year, but it's still Apple's fastest system. Its only problem, besides the nonergonomic mouse, is the wallet-busting price. Only power users who absolutely need the faster performance this model provides are likely to consider paying an extra \$1,000 over the 450MHz G4's price. Nevertheless, the G4/500 remains Apple's dream system—at least until the next release.—DAVID READ

RATING: ★★★★★ **PROS:** Exceptional performance; DVD-RAM drive. **CONS:** Expensive; too little memory for high-end users. **COMPANY:** Apple Computer (800/692-7753; www.apple.com). **LIST PRICE:** \$3,499.

Macworld
LAB TEST

The Fastest Mac—for Now

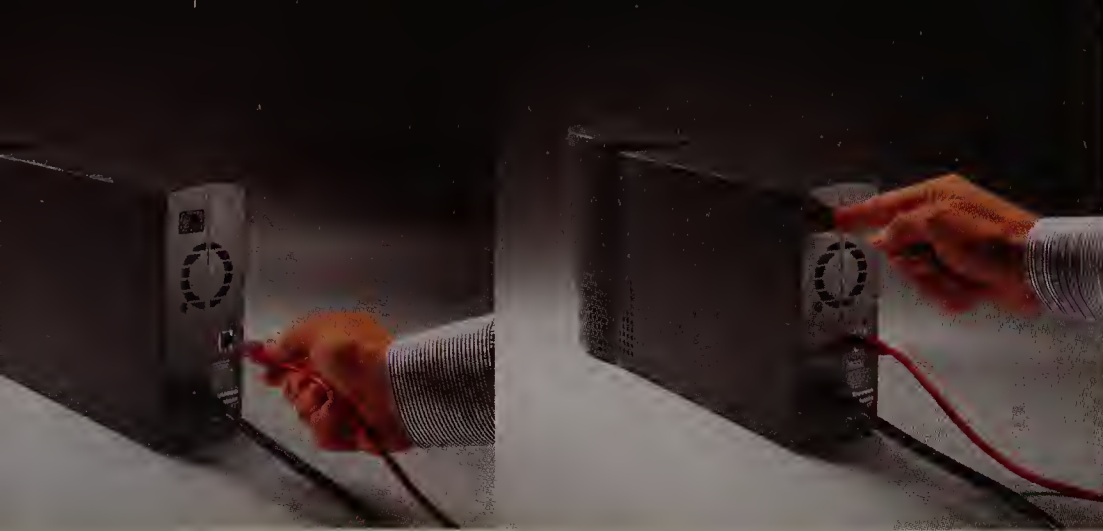
Best results in red. Reference systems in italics. Photoshop 5.5 results are in seconds. Bryce 4 and SoundJam 1.6 results are in minutes:seconds. Quake III results are in frames per second.

	PHOTOSHOP					BRYCE	SOUNDJAM	QUAKE III
	Gaussian Blur	Unsharp Mask	RGB to CMYK	Resize	Lighting Effects	Render Scene	MP3 Encode	Normal
Apple Power Macintosh G4/500	3.3	5.8	13.1	5.9	4.2	17:25	1:54	44.7
Apple Power Macintosh G4/450	3.8	6.4	14.3	6.1	4.6	19:41	2:12	41.9
Apple Power Macintosh G3/450	11.3	10.7	15.0	9.7	12.9	20:49	3:01	31.7

Shorter bars are better. For Quake frame rates, longer bars are better.

Behind Our Tests

We tested each system with Mac OS 9, a minimum of 128MB of RAM, a 2MB system disk cache, and virtual memory disabled. We performed Photoshop tests with a 30MB file. We tested MP3 encoding with an audio-CD track that was 9 minutes and 25 seconds in length.—Macworld Lab testing supervised by Gil Loyola



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FireWire Scanners

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VETERANS OF SCSI NIGHTMARES will be amazed and delighted to discover how easy it is to connect a FireWire scanner to a current Mac. No need to set IDs, no worrying about termination—and you don't even have to shut down your computer to connect and disconnect them.

Two new scanners, the Epson Expression 1600 and the Umax PowerLook 1100, more than live up to FireWire's promise not only of plug-and-play but also of speed: both scanners can transfer an 18MB scan from a 35mm original in well under a minute. Unfortunately, the scanner-control software that accompanies these pro-level scanners is woefully inadequate.



Epson's Expression 1600

Resolving Our Differences

The Expression offers the higher resolution of the two—1,600 by 3,200 dpi, compared with the PowerLook's 1,200 by 2,400 dpi. But the PowerLook has a slightly higher dynamic range, pulling out more shadow detail when scanning high-contrast transparencies. When you're scanning negatives or prints, which require far less dynamic range for adequate scanning, you probably won't see a difference between the Umax and the Epson.

Both scanners feature asymmetrical resolutions: the lower number indicates the physical resolution of the CCD detector that actually reads the information; the higher number is obtained by stepping the scanning head in half-pixel increments. If you scan at the higher resolution, therefore, you get real pixels in the vertical dimension and interpolated pixels in the horizontal dimension. In practice, we saw obvious interpolation artifacts in 3,200-dpi

Expression scans but not in 2,400-dpi PowerLook scans, and the artifacts worsened when we applied sharpening in an image editor. The Expression clearly resolved more detail at 2,400 dpi, however.

Controlling Personalities

Without good software to control it, scanner hardware is just an expensive doorstop. When it comes to scanner software, the makers of mass-market desktop scanners simply don't get it, and in this case Epson seems to not get it to a considerably greater degree than Umax. The previous generation of Epson Expression scanners featured LaserSoft's very capable SilverFast driver, but Epson has unfortunately chosen to develop its own driver for this generation.

Both scanners are driven by TWAIN modules that can function as Adobe Photoshop plug-ins or as stand-alone applications. Umax's MagicScan 4.4 offers a reasonably full complement of manual controls, along with an on-screen densitometer that displays the pixel values beneath the cursor. Epson's TWAINPro lacks a similar feature, forcing you to rely entirely on the preview. And TWAINPro's manual controls are, in a word, goofy. The scanner industry generally agrees that a gamma of 1.0 represents linear output; Epson's gamma values range from 50 to 500.

Out of Sync

As far as color management is concerned, neither company gets it. Photoshop has offered arbitrary RGB working spaces independent of the monitor for almost two years now, and it's dismaying when scanners in this price range offer no obvious way to get accurate color into the application people are more likely to use than any other. Umax offers MagicMatch, which uses Kodak's color-matching technology to let you scan to any RGB or CMYK printer profile or to CIELAB, but not to "space" profiles such as those that represent Photoshop's RGB working spaces. Epson claims its TWAINPro supports ColorSync, but all the ColorSync button does is disable manual controls and convert from an invisible scanner profile to your monitor's profile. If you edit

an image in either application based on the preview, the scan will look completely different in Photoshop.

The one ray of sunshine is that both scanners can export raw high-bit data into Photoshop, though that process isn't mentioned in either scanner's documentation. Neither scanner does a particularly good job of creating a positive image from a color negative, which means you'll have to edit those images in Photoshop.

Both scanners offer film holders for mounted 35mm transparencies as well as for larger film formats, but only the Expression offers a holder for unmounted film strips. When you use the 35mm slide tray, the PowerLook's MagicScan locates each image without user intervention, so you can quickly create raw scans from a batch of slides. The Expression's TWAINPro has an autolocate button, but it fails to crop the images correctly—it can lose as much as a third of the image.

Macworld's Buying Advice

If you're experienced at scanning, you'll get good results from either of these scanners. Choose the Epson Expression 1600 if you need the higher optical resolution or plan to scan a lot of color negatives; otherwise, you'll probably be more productive with the Umax PowerLook 1100. If you're a novice, be prepared for a steep learning curve as you figure out why your Photoshop images bear no resemblance to what you saw in the scanner driver's preview.—BRUCE FRASER

Expression 1600

RATING: ★★½ **PROS:** Highest resolution in its class. **CONS:** Idiosyncratic manual controls; lackluster color-management support; obvious aliasing on 3,200-dpi scans; no on-screen densitometer. **COMPANY:** Epson America (800/463-7766, www.epson.com). **COMPANY'S ESTIMATED PRICE:** \$1,399.

PowerLook 1100

RATING: ★★★ **PROS:** Batch-scanning features; good CMYK scanning. **CONS:** Lackluster color-management support; no holder for unmounted film strips. **COMPANY:** Umax Technologies (800/562-0311, www.umax.com). **COMPANY'S ESTIMATED PRICE:** \$1,799.

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AppleWorks 6

ONE STEP FORWARD, TWO STEPS BACK FOR SUITE

WE ALL KNOW THAT THE number 13 is considered bad luck, but in the world of software publishing, the unlucky digit seems to be 6. In light of the poor performance of some recent version 6 releases—Microsoft Word 6.0, Now Software's Now Utilities 6.X, and the latest arrival, Apple's AppleWorks 6—software publishers may just decide to skip directly from version 5.0 to version 7.0.

AppleWorks 6 is the latest iteration of the entry-level office suite that once bore the ClarisWorks name. Renowned for the level of integration among its word processing, draw, paint, database, and spreadsheet components, ClarisWorks Office also garnered respect for its speed, relatively small RAM and hard-disk requirements, and ease of use. When Apple absorbed its Claris division, ClarisWorks Office became AppleWorks 5. Other than the name change, there was no discernible difference between the two. There *is*, however, a marked difference between AppleWorks 5 and AppleWorks 6. Regrettably, few of the changes are for the better.

Progress in Works

Before addressing AppleWorks 6's weaknesses, we should note that the program includes some welcome new elements. A new module that allows you to create presentations has replaced the Communications module, which was largely unnecessary unless you needed to access certain bulletin boards or transfer files via serial link. The Presentation module is helpful and easy to use, but it's hindered by its inability to display images at more than 640-by-480-pixel resolution.

Version 6 also includes a Tables tool that lets you place tables within just about any AppleWorks element—word processing, graphics, spreadsheet, and database documents, for example—though you can't place tables within tables. And for the first time in AppleWorks' history, its Clippings files—clip art you can paste into your documents—are actually attractive enough to be serviceable. To find additional clippings online, you can use the Search Web Content option within the Clippings window.

Bitter Suite

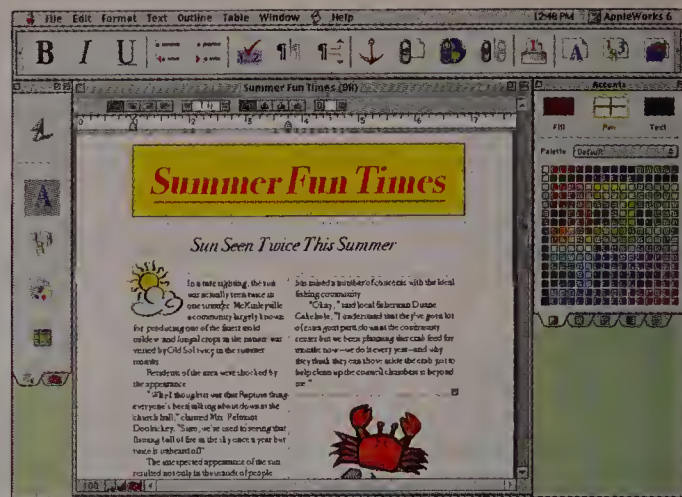
Although these additions are welcome and AppleWorks 6 remains a reasonably powerful software suite, the changes in this version hobble the program in a number of significant ways.

To begin with, AppleWorks no longer includes translators. Unlike previous versions of the program, AppleWorks 6 can't open the native file format of such ubiquitous programs as Microsoft Word and Excel. Likewise, you can save word processing documents only as AppleWorks, AppleWorks 5.0, ClarisWorks 4.0, ClarisWorks for Kids, HTML, and text files. Reportedly, Apple stripped every bit of 680X0 code from AppleWorks for greater compatibility with the upcoming OS X, and the previously included translators depended on this older architecture.

This explanation offers little balm for the many AppleWorks users who must deal with countless documents created by Microsoft applications. Although you can add translation capabilities to AppleWorks with DataViz's \$100 MacLink Plus Deluxe (www.dataviz.com), you may be able to avoid paying a C note for translators if you have ClarisWorks or a previous version of AppleWorks; their translators work with AppleWorks 6 as well.

Second, AppleWorks 6's interface—though it attractively foreshadows some of what you'll see in OS X's Aqua interface—emphasizes form over function. AppleWorks' Button Bar, where common commands such as Open and Font once resided, has swelled to include enormous buttons (even the "small" buttons are larger than version 5's) that can appear only in a single row; you can't resize the similarly elephantine Tools window, either. Including such rotund buttons limits the number of buttons that can appear in the Button Bar, which means it's missing such staples as the pop-up Font, Font Size, and Font Styles menus.

You can add buttons if you like, but then you'll probably have to use the scrolling arrows at either end of the Button Bar to navigate to the button you desire, which obviates the need for but-




Big Buttons Even those with poor eyesight can make out AppleWorks 6's exceedingly large buttons. The problem is that the Button Bar can now accommodate only a few buttons.

tons—if you must scroll the Button Bar, why not just use the corresponding menu command instead? Also, unlike those in previous Button Bars, the buttons in AppleWorks 6 give no indication of their state—whether they're on or off.

Finally, AppleWorks 6 just doesn't work as well as it should. The program is terribly slow if you're running it on anything other than a G3 or G4, and even on a fast G3 the Open and Save dialog boxes take far too long to display their contents. Although AppleWorks offers a Web enhancement—allowing you to gather clippings from the Web—you must first connect to the Web and then download the files; unlike most Web-savvy applications, AppleWorks can't initiate a dial-up connection. And AppleWorks is incompatible with some popular applications and utilities, such as IBM's ViaVoice 1.0 and Power On Software's Action Utilities suite.

Macworld's Buying Advice

AppleWorks 6 is a seriously flawed product that deserves a stern overhaul. Once that overhaul is complete—meaning that the program can translate common document types, sports a more streamlined interface, is sprightlier on slower Macs, and has broader compatibility with common utilities and applications—it may approach the elegance and usefulness of its predecessors.—CHRISTOPHER BREEN

RATING:  **PROS:** New Presentation module and Tables tool; can download additional Web content. **CONS:** No translators; clunky interface; slow; incompatible with common programs. **COMPANY:** Apple Computer (800/692-7753, www.apple.com). **LIST PRICE:** \$79.

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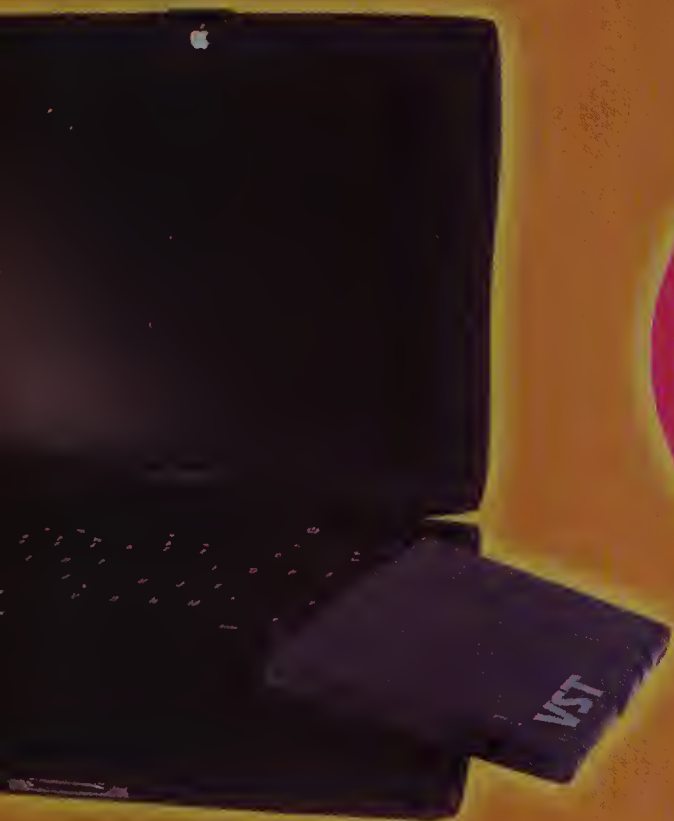
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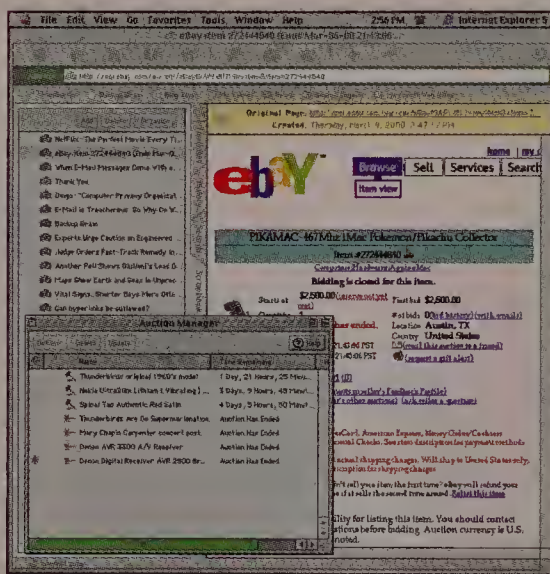
Macworld

Reviews

Internet Explorer 5

HANDS DOWN, THE BEST BROWSER

MICROSOFT'S INTERNET Explorer (IE) 5 is not only the best Web browser ever released for the Macintosh, but also arguably the best Web browser ever released for any computing platform. Built for speed and compliant with Internet standards, IE 5 strikes an excellent balance between users' needs and developers' desires. Thanks to performance far superior to that of the aging Netscape Navigator 4.X, there's no compelling reason not to download the new version.



Auction Madness Internet Explorer 5's new Internet Scrapbook displays a past auction page, while the Auction Manager shows current auction items.

IE 5 for the Mac is the first browser on any platform to correctly and fully implement the two-year-old HTML 4 and CSS-1 Web standards. That's important because standards let designers ensure that their pages display correctly on any browser that supports those standards. But IE 5 still has a ways to go; it offers only partial support for the XML, CSS-2, and DOM-1 standards, which will usher in the next wave of Web innovation.

A browser's most important mission is to make pages look good and download quickly. With IE 5's new page-rendering engine, pages appear faster than in IE 4.5, the former Mac browser speed champ. If a Web page doesn't render correctly in IE 5, it was probably tweaked to look good in noncompliant browsers such as Navigator 4.X or IE 5 for Windows. IE 5 for the Mac tries to make the best of such a page by mimicking the behavior of other, older browsers.

In a bid to solve the widespread problem of Web pages authored in Windows appearing with tiny type on Macs, IE 5 introduces switchable screen resolution. By default, IE displays pages at 96 dpi (the Windows standard), but you can set the browser's resolution to match your screen's resolution.

Microsoft hasn't skimped on new features or eye candy. The program's tool bars and icons have been updated, and you can customize them with your favorite iMac color. The Favorites tool bar now lets you include folders, which turn into pop-up menus of bookmarks when you click on them. The Address Bar still autocompletes typed URLs, but it now drops down a list of matching URLs that change as you type, and it lets you tab or scroll through the list. And fans of Macromedia's Flash will be happy to note that IE for the Mac can now use JavaScript to detect plug-ins, so sites that rely on Flash should work correctly.

Two other new features are especially useful. The redesigned Explorer Bar contains an Internet Scrapbook tab that takes snapshots of Web pages for future reference, and the new Auction Manager tracks items, bids, and time remaining on eBay, Amazon, and Yahoo auctions. You can set the Auction Manager to check the status of auctions and notify you if you're outbid, though it doesn't list the current price or help place or increase bids. The Explorer Bar's new Search Assistant, on the other hand, fails on most counts: it's ugly, slow, and barely customizable.

Macworld's Buying Advice

It's always heartwarming when Microsoft's Mac developers produce a better product than their Windows counterparts, and Internet Explorer 5 for the Mac takes the lead in a big way. It supports Web standards better than any other shipping browser, it solves the problem of pages rendering differently across platforms, and it adds innovative features such as the Internet Scrapbook. This is a welcome case where the upgrade decision is a no-brainer: just get it.—TOM NEGRINO

RATING: 1/2 **PROS:** Excellent support for some Web standards; useful Internet Scrapbook; solves screen-resolution problems. **CONS:** Poor Search Assistant; needs additional standards support. **COMPANY:** Microsoft (425/882-8080, www.microsoft.com). **LIST PRICE:** Free.

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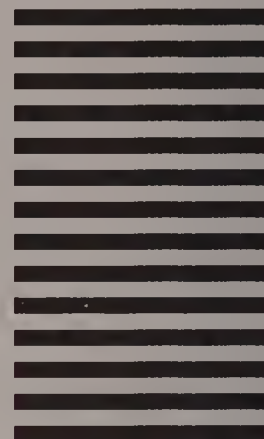
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SCALABLE DATABASE PUBLISHING ON THE WEB—FOR A PRICE

FILEMAKER INC.'S LATEST OFFERING, FileMaker Pro 5 Unlimited, lets you publish FileMaker databases for large audiences on the Web. It differs from FileMaker Pro 5 (see *Reviews*, February 2000) in three ways: it can serve databases to Web users without restriction (FileMaker Pro 5 is limited to ten Web users in any 12-hour period); its Web Server Connector hooks into third-party Web servers; and it costs \$999. Sound underwhelming? It should—especially at that price.

Unlimited but Not Unbounded

Like FileMaker Pro 5, the Unlimited version offers a feature called Instant Web Publishing, which uses Cascading Style Sheets (CSS) to render screen layouts to CSS-compatible browsers with remarkable visual fidelity. However, it doesn't take many visitors using Instant Web Publishing simultaneously to strain Unlimited's serving capabilities.

Instant Web Publishing can also be CPU intensive, further reducing performance. You can avoid this feature altogether by using add-on middleware products, such as Blue World Communications' Lasso and Pervasive Software's Tango, or by using CDML, FileMaker's built-in proprietary syntax for integrating database content into ordinary Web pages. Unfortunately, CDML documentation will be available only with FileMaker Developer 5, a separate \$500 product (unavailable at press time). Without documentation, creating custom Web pages is essentially off-limits.

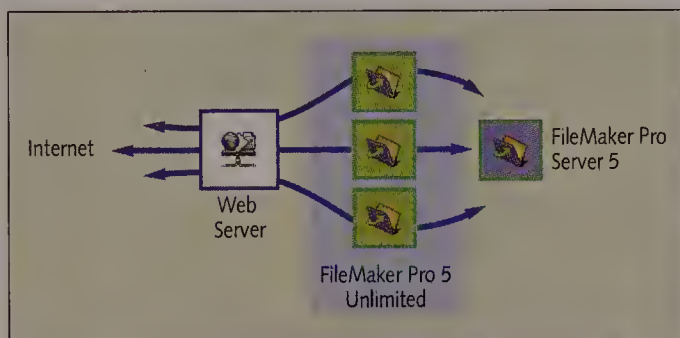
Unlimited's performance workaround is Web Server Connector, a Java servlet that hooks into WebStar, AppleShare IP, Mac OS X Server's Apache, Microsoft's IIS, and Netscape Enterprise Server. Web Server Connector allows database publishing with capabilities like SSL and flexible security options—and it can access multiple copies of FileMaker Pro 5 Unlimited. Using the \$1,000 FileMaker Pro Server 5, Web Server Connector can shuffle requests to databases on a redundant array of inexpensive computers

(RAIC). If you constructed a RAIC using three copies of Unlimited, a query would tie up only one copy, leaving the other two available. However, this scenario requires roughly \$4,000 in FileMaker software alone (see "RAICing It In").

In tests using WebStar 4.2 and Mac OS X Server 1.0.2, Web Server Connector held up under fire. It distributed queries to available copies of Unlimited when others were tied up, and it coped with the loss of RAIC members due to network problems or software crashes. However, it offers no security options, requires manual database management, and can't filter incoming queries.

Macworld's Buying Advice

FileMaker Pro 5 Unlimited has little to recommend it over FileMaker Pro 4.X, which cost \$250 and didn't place restric-



RAICing It In FileMaker Pro 5 Unlimited can serve databases using a redundant array of inexpensive computers, improving performance over a single copy of FileMaker Pro but straining the definition of *inexpensive*—each green-bordered box represents about \$1,000 in software costs.

tions on Web publishing. FileMaker Pro 5 *does* offer XML capabilities, but only a handful of browsers currently support XML—and if you're knowledgeable enough to publish XML, you can do it without FileMaker Pro 5 Unlimited. In short, FileMaker Inc. now offers scalable Web publishing but requires customers to pay four times as much for the privilege.—GEOFF DUNCAN

RATING: ★★ **PROS:** Unrestricted Web-database publishing; can integrate with third-party Web servers. **CONS:** High price; unresolved performance issues; inadequate documentation. **COMPANY:** FileMaker Inc. (800/325-2747, www.filemaker.com). **LIST PRICE:** \$999.



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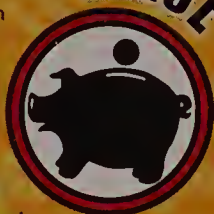
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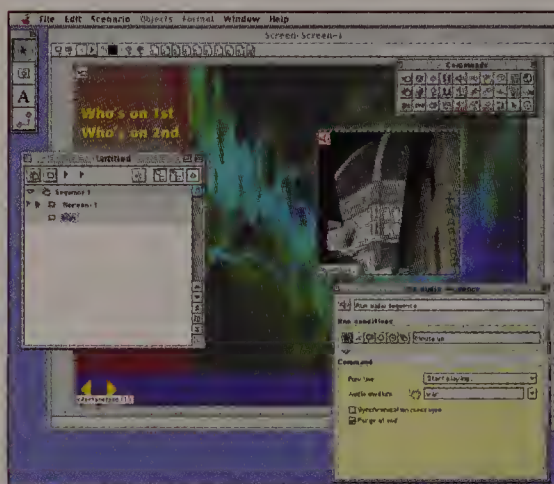
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Reviews

Katabounga 3.0

COMPLEX MULTIMEDIA AUTHORIZING

WITH SEEMINGLY EVERYONE focused on creating content for the Web, it's easy to forget that you sometimes need to deliver media and presentations in a physical, higher-bandwidth form. Abvent's Katabounga 3.0 allows you to create and script fully interactive multimedia presentations for delivery on CD-ROM, in kiosks, or as live presentations. Capable of handling just about any media, Katabounga offers a nice balance of icon-based authoring and more-complex scripting, as well as cross-platform playback. Unfortunately, the package's documentation is so impenetrable as to render the product very difficult to learn.



Point-and-Click Authoring Katabounga 3.0's point-and-click command dialog boxes let you attach behaviors and event handlers to objects on screen.

Katabounga presentations comprise a series of *screens* arranged into *scenarios*. Screens are roughly analogous to pages in a Web site or cards in a HyperCard stack, while scenarios are simply a way of organizing screens into a larger structure. The Project window lets you easily create, title, and rearrange screens and scenarios.

Screens can consist of still images, QuickTime movies, QuickTime VR objects, buttons, sprites, or text elements. You drag images and movies from the program's Media palette onto a screen, where they can be layered, cropped, and resized. Unfortunately, the program lacks rotation controls and a method for interactively scaling objects, so screen layout can be a bit tedious.

You create controls such as buttons, scroll bars, and dials by importing separate graphics for each state of the control.

Though Katabounga takes care of changing the control's state, the program won't automatically create any graphics. And since the program provides no drawing tools of its own, you'll need to create your graphics elsewhere. You can, however, enter text or import external text files for display on screen, and you can easily create hypertext links in any block of text, making Katabounga a simple tool for creating complex hypertext systems.

Katabounga combines point-and-click authoring with a full-blown scripting language for specifying how each object will handle particular events. To add functionality to a button or object, you drag the appropriate command handler from the Commands palette and drop it onto your object; you then configure its behavior using a dialog box. But although Katabounga's selection of commands is comprehensive, the Commands palette's icons offer no tool tips or labels.

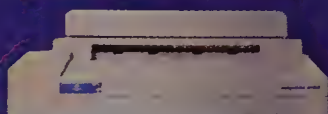
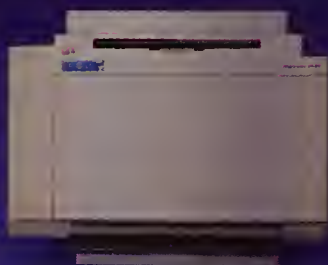
For more-complex interactivity, you can use the program's Bounga scripting language to control media management and navigation and to manipulate graphics. But although it includes **repeat** loops and **if/then** constructs, it lacks more-sophisticated logical structures and suffers from inconsistent syntax.

Finally, Katabounga's manual is among the worst we've seen. Offering no tutorials, horrid organization, a paltry index, and poor explanations of basic concepts, it's all but unusable. In a program this complex, that's a serious liability.

Macworld's Buying Advice

Katabounga 3.0 is a stable, well-conceived, well-implemented package. Though it comes up a little short on content creation and its scripting language isn't as fluid as others, its point-and-click authoring tools and impressive media management make it a good authoring environment. Expect to spend a lot of time experimenting, though; the program's documentation will offer little help.—BEN LONG

RATING: ★★★½ **PROS:** Good combination of point-and-click authoring and scripting; stable; good media support. **CONS:** Nearly unusable documentation; lacks some programming structures; scripting syntax a bit clunky. **COMPANY:** Abvent (800/452-9241, www.abvent.com). **LIST PRICE:** \$595.

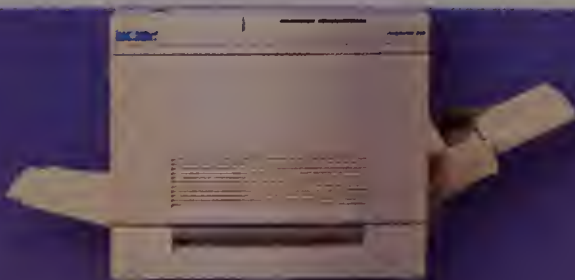


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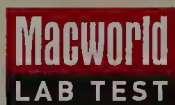
iMaxpowr G3

FASTEST iMAC IN TOWN—FOR A PRICE

THE FIRST UPGRADE CARD FOR iMacs is here, and it's fast. With its 466MHz processor, Newer Technology's iMaxpowr G3 is the fastest iMac configuration yet. If your older iMac is beginning to huff and puff during its daily grind, you may want to consider an upgrade. Unfortunately, you can't use this one in the currently shipping iMacs—specifically the 350MHz blueberry model and the iMac DVs—but it's compatible with earlier models. So if you're not averse to opening up your machine, the iMaxpowr G3 will give you the fastest iMac in town.

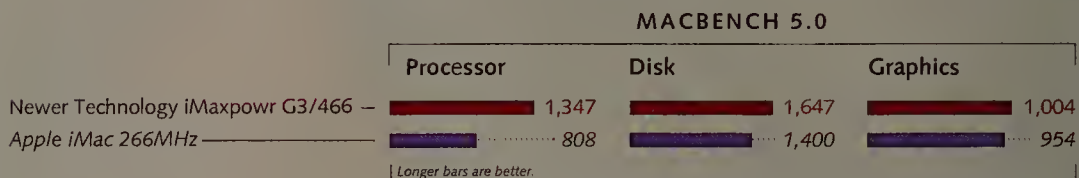
Once installed, the iMaxpowr G3 requires no software, and your iMac will run as smoothly as before—only faster. Macworld Lab testing showed upgraded iMacs to be faster than original iMacs in every case (see "Rev Up Your iMac"). And because Apple ROMs are already on the upgrade card, the new processor will work properly in your iMac. (To get the ROMs necessary to manufacture more upgrades, Newer will buy back your iMac's original processor and send you a \$200 rebate.)

The average iMac user can probably



Rev Up Your iMac

Best results in red. Reference system in italics. MacBench 5.0 scores are relative to those of a first-generation Power Mac G3/300, which is assigned a score of 1,000 for each test.



Behind Our Tests

Testing was performed on a system with Mac OS 9, 64MB of RAM, and a 2MB system disk cache, with virtual memory disabled.—Macworld Lab testing supervised by Jeff K. Milstead

install the iMaxpowr G3, but if you've never touched a circuit board before, you may find installation daunting. Newer provides excellent written instructions complete with photos of every step, as well as a ten-minute video to ease you through the installation process. Unfortunately, the video isn't all that helpful; it's designed to show you how easy installation is rather than how to install the card.

Macworld's Buying Advice The iMaxpowr G3 upgrades your iMac to a fast 466MHz G3, at a price in line with that of similar G3 upgrades. It will make your

iMac faster than the iMac DV Special Edition, although it won't add FireWire or DVD capability. If your need for speed is such that you'll part with \$499, then upgrade and prosper.—DAVID READ

RATING: ★★★★★ **PROS:** Fast; reasonably priced; requires no software; good documentation. **CONS:** Difficult to install. **COMPANY:** Newer Technology (316/943-0222, www.newertech.com). **COMPANY'S ESTIMATED PRICE:** \$699 (\$499 after rebate).

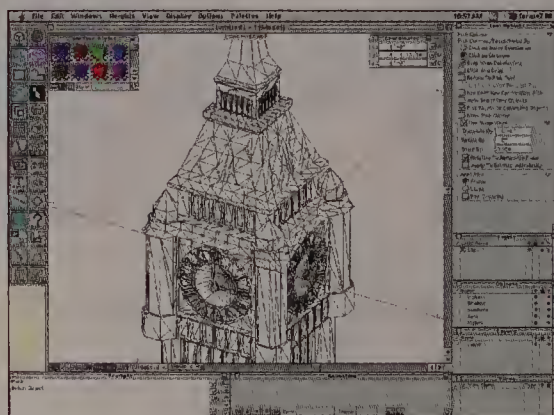
form-Z RenderZone 3.5

ONE-TRICK PONY OFFERS POWERFUL 3-D MODELING

WITH MORE AND MORE HIGH-end 3-D graphics work moving to PC-based applications such as Discreet's 3D Studio Max, Mac users are finding themselves a little underpowered. Fortunately, autodessys's form-Z RenderZone, one of the oldest and most powerful 3-D-modeling programs for the Mac, is alive and well. With version 3.5, autodessys has fixed some problems and added new features to its venerable application. Unfortunately, form-Z's continued lack of animation facilities, as well as other frustrating limitations, won't help the program lure users of more-complete packages.

Besides fixing many of the minor bugs that plagued the last version, version 3.5 restores the Object Status palette, making it easier to manipulate objects. The update also fine-tunes existing tools; for example, you can now change control points on NURBS objects from smooth to nonsmooth. Version 3.5 also supports right-to-left text and adds a menu option for jumping to a Web page that offers technical support.

But many of form-Z's problems still remain. The navigation controls are clunky,



Time to Upgrade Version 3.5 of form-Z RenderZone adds new features, though its interface needs work.

in some cases lacking important functionality. Most users will probably want to create 2-D profiles in another program—as in previous versions, form-Z RenderZone 3.5 has underpowered 2-D tools, many of which lack control handles. And although individual objects in form-Z have centroids, groups of objects do not, so you can't define a pivot point for rotating or scaling. In general, form-Z lacks elegant tools for transformations that use an object's local coordinate space.

It's often said that you can model anything you can imagine using form-Z. This may be true, but a lot of the things you might imagine would be incredibly difficult to model with this package. If you plan to do any character modeling or create complex, curved surfaces, you'll want a true spline modeler; form-Z's spline tools still aren't up to the task. However, form-Z offers great solids tools, making it ideal for architectural modeling.

Macworld's Buying Advice Though form-Z RenderZone is a great program, potential users need to know where its strengths lie. For modeling tasks that a polygonal modeler would serve well, form-Z is an excellent choice. If you need maximum flexibility, you might be better off with NewTek's Lightwave or Maxon's Cinema 4D XL. And if you're planning on doing any animation, remember that you'll have to do it elsewhere. Current users should definitely upgrade to 3.5, though; it's a one-trick pony, but it does that trick very well.—BEN LONG

RATING: ★★★★★ **PROS:** Robust tool set; true solids modeler; excellent architectural features. **CONS:** Weak navigation tools; lackluster 2-D tools. **COMPANY:** autodessys (614/488-8838, www.formz.com). **LIST PRICE:** \$1,495.

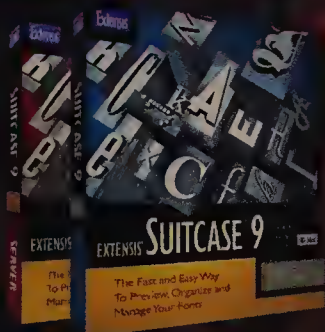


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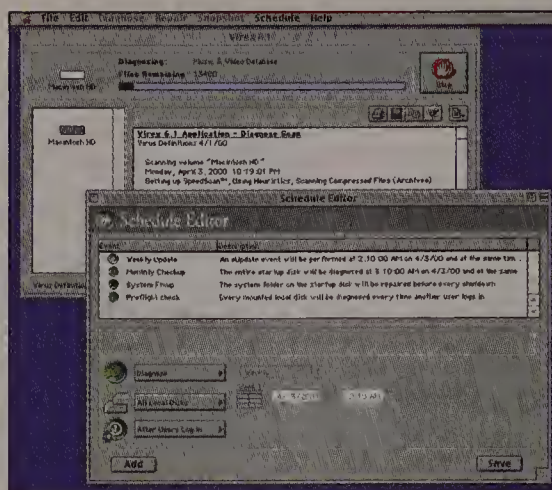
TM

Virex 6.1

VIRUS DETECTIVE UPDATES ITSELF

THE FBI RECENTLY WARNED OF A new virus that wipes out the victim machine's hard drive, and then uses its modem to dial 911. The virus attacks only Windows systems, fortunately, but the Mac has its share of viruses, and the severity of computer security attacks of all kinds is on the rise. More than ever, users must arm their systems with the latest virus-detection and disinfection software. Network Associates' Virex 6.1 helps keep your electronic vaccinations current—by downloading new virus definitions, scheduling regular checkups, and maintaining a “patient chart” tracking your system's health—to catch infections early.

Virex consists of an application to scan all your hard drives and a control panel that automatically checks new files brought into your system via removable disk or network connection. Virex can optionally scan shared volumes when they're mounted, and even compressed files as they're downloaded. Version 6.1 remains unobtrusive and efficient, scanning silently away in the background and using spare CPU cycles when it can. Network Associates has cleaned up



Timing Is Everything Virex 6.1's handy scheduling feature helps you keep your system clean.

Virex's interface, making it easy even for computer newbies to operate.

The first time you run Virex, it records the status of all your files; subsequent scans examine only files that are new or have changed. The new release enhances Virex's scheduling feature: you can now schedule multiple events, choosing which volumes you want to scan and repair. You can also schedule automatic downloading of Virex's virus definitions. In our tests, Virex added a month's worth of new detection and repair rules in just a few minutes.

The new release lets you lock your Virex settings safely away under password protec-

tion—an excellent security feature for corporate LANs, preventing users from bypassing network-protection policies. The new Snapshot tool lets you record the complete state of all your files and then compare them over time. Viruses often infect many files on a host system simultaneously; the Snapshot feature detects such wholesale changes and alerts you to the possibility of a hitherto unknown infection.

Macworld's Buying Advice Virex 6.1 improves on the clean interface of previous releases and adds a slew of new features: live updates, sophisticated scheduling, and early warning of new or mutant infectious agents. It still requires a hefty amount of start-up RAM (more than 1MB), but RAM is cheap. Speed improvements and a streamlining of its interface make Virex simple to use and therefore likely to be used often. Viruses are a serious threat to your computer's health; Virex can keep it safe without becoming a pain in the injection site.—MEL BECKMAN

RATING: **PROS:** Unobtrusive operation; sophisticated scheduling tool; fast and easy live updates; Snapshot feature. **CONS:** Large RAM hit for background operation. **COMPANY:** Network Associates (800/338-8754, www.nai.com). **LIST PRICE:** \$50.

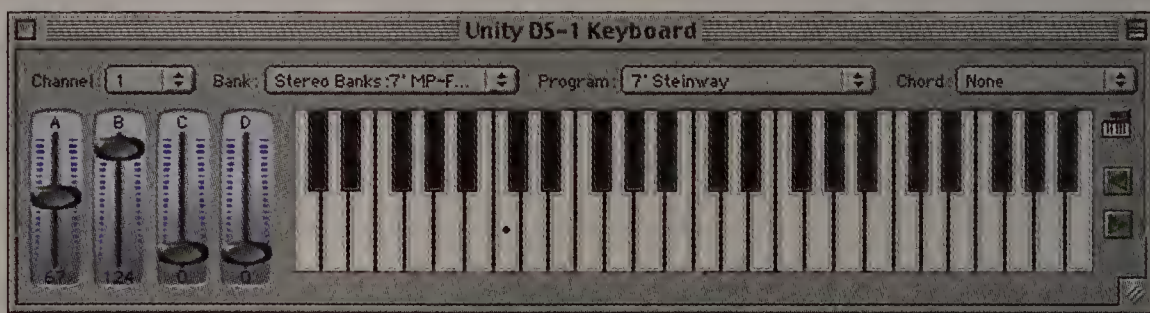
Black & Whites

SOFTWARE-SAMPLED PIANO SOUNDS

THE BEEFY PROCESSORS IN MODERN-day Macs not only help applications run briskly, but also enable Macs to take on chores that were once the domain of peripheral devices. With the right pairing of software and a G3 or G4 processor, your Mac can imitate a DVD player, a console game machine, or a PC. And with Black & Whites from BitHeadz, you can even turn your Mac into a music synthesizer. Given enough RAM and a fast processor, this collection of sampled acoustic and electric pianos plays and sounds very much like the real thing.

Black & Whites is a scaled-down version of BitHeadz' software sampler, Unity DS-1 (see *Reviews*, June 1999), lacking Unity's many banks of sounds, editor (for tweaking sound parameters), and MIDI processor (for combining sounds). Essentially a sample player, Black & Whites takes its sounds from 9-foot and 7-foot Steinway pianos, as well as a Fender Rhodes electric piano.

To get the most from Black & Whites, you need a Mac with a hefty complement of RAM. The Unity DS-1 engine, which pow-



...and Red All Over You can choose Black & Whites sounds from the Unity DS-1 Keyboard window.

ers Black & Whites, loads all samples into RAM and requires 7MB of its own. Because Black & Whites' largest samples can top 40MB, you must dedicate at least 47MB of free RAM to the Unity DS-1 engine to play these sounds. If you've checked the Expand Samples When Loaded option in the Unity DS-1 control panel (as BitHeadz recommends if you desire more polyphony), you must configure the control panel's memory settings to twice the size of the largest sample. That means Black & Whites alone could easily devour 128MB of RAM.

But the results are worth it: on a 250MHz PowerBook G3 with 288MB of RAM, there was no discernible delay between when we pressed a key on our MIDI controller and when the note sounded. The pianos were sampled at different dynamic levels—from pianissimo to fortissimo—and sounds had rich, realistic tones. You can select

from among single-dynamic groups—all notes played at mezzo forte, for example—or choose multisampled sets, in which samples are layered and triggered by your MIDI controller's velocity. Within each set you can select sounds that have had effects such as chorus and reverb applied.

Macworld's Buying Advice Black & Whites is a fine-sounding, remarkably responsive piano-sample player. If you have a hankering to tickle the ivories, a reasonably fast Mac, and a load of RAM, this program may be the key to your musical success.—CHRISTOPHER BREEN

RATING: **PROS:** Responsive; sounds good. **CONS:** RAM hog. **COMPANY:** BitHeadz (888/870-0070, www.bitheadz.com). **LIST PRICE:** \$199.

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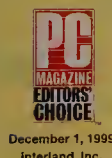
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NetMinder Ethernet 4.1

NETWORK MONITOR GOES MOBILE

DIAGNOSING NETWORK PROBLEMS was hard enough when a network stayed in one place. Today, with users dragging their iBooks and iMacs about with abandon, connecting at random Ethernet ports or via entirely too mobile wireless links, network-troubleshooting tools need to grow legs to keep up. That's exactly what Neon Software's multifunction diagnostic tool, NetMinder Ethernet 4.1, has done, in the form of support for AirPort wireless-networking cards and modern PowerBooks' built-in 100BaseT Ethernet. Neon has also added a sprinkling of feature enhancements, helping the product keep up with breakneck-speed networks.

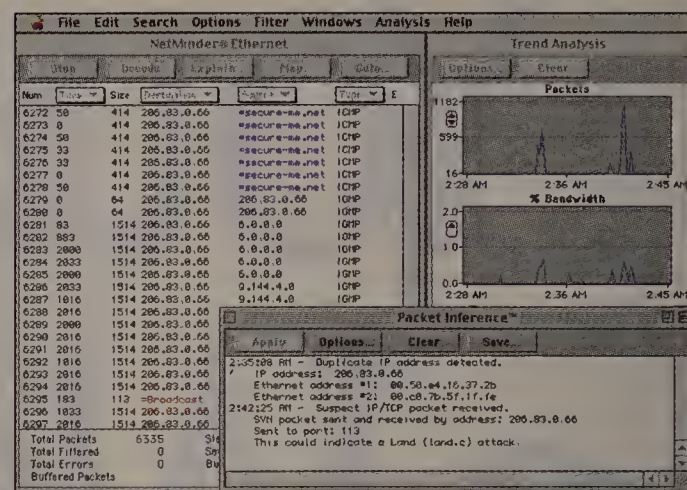
NetMinder monitors your network through a Mac Ethernet port, displaying packets as it catches them; color coding lets you quickly sort through protocols. And NetMinder's AirPort-card support lets you turn any AirPort-capable Mac into a sniffer, inhaling packets as they flow between wireless users and their AirPort Base Stations.

You can configure as many as five filters and set triggers to start and stop capture at

specific network events. The program decodes packets well, although it still lacks such refinements as unlimited complex filtering. As NetMinder captures packets, it tracks traffic levels in a histogram, which you can output as an HTML document for remote Web monitoring.

Since the 4.0 release, Neon has also enhanced NetMinder's trademark Packet Inference engine, a little artificial-intelligence gnome that looks for and reports on odd happenings in your network. The engine can now detect various kinds of hacker attacks, although it still has no means of generating external notifications to alert you to unusual events. Neon could also improve NetMinder's documentation: the latest manuals aren't online, the printed documentation covers only older releases, and online help is limited to a general description of the program's functions.

Macworld's Buying Advice NetMinder Ethernet's main competitor, AG Group's EtherPeek, is still the most power-



Hackers Inbound! NetMinder Ethernet 4.1 is smart enough to catch hackers in the act, although it doesn't sound any alarms.

ful network-analysis tool. However, NetMinder is easier for less sophisticated users to master, and Neon's willingness to remain current with Apple's latest network-hardware offerings proves the company is committed to its niche.—MEL BECKMAN

RATING: **PROS:** Trend, protocol, and address-analysis graphs; rule-based problem detector; AirPort support; HTML output. **CONS:** No paging or e-mail notification; weak documentation. **COMPANY:** Neon Software (800/334-6366, www.neon.com). **LIST PRICE:** \$795.

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Tom Clancy's Rainbow Six

CHALLENGING FIRST-PERSON ACTION/STRATEGY GAME

AS YOU SLINK DOWN THE embassy hallway, signaling to your black-clad corps to quietly clear the library of unfriendlies, you peer through the door to your left and see your objective—the foreign ambassador held hostage by terrorists. You burst through the door, swiftly sweeping the room with your M16. Except for the ambassador, the room is now still. You turn to escort the foreign dignitary from the building as your team clears the way. Out of the corner of your eye, you detect movement. *Blam!* You're dead.

If this is your idea of a good time, you're going to love Tom Clancy's Rainbow Six, an action/strategy game from MacSoft. The preceding scenario gives you a fair idea of what Rainbow Six (which takes its name from one of Mr. Clancy's latest literary efforts) is all about. You command an antiterrorist group through a series of missions: your main objectives are freeing hostages and killing bad guys. In traditional first-person shooters, you dash through dungeons, scattering death as you go. Applying the same techniques in Rainbow Six will get you and your team killed in a

hurry—the game devotes as much thought to planning missions as to their execution.

Fans of traditional first-person shooters may find the game's mission-planning component tedious. You do have to spend a fair amount of time choosing members for the teams, selecting weapons and camouflage, and plotting the movements of each team through the structures you intend to assault. Fortunately, the first few levels of Rainbow Six allow you to play with pre-designed teams and plans. Using these defaults is a great way to get a feel for mission planning and team control—helpful when you have to assemble your own teams and plan missions in later levels.

MacSoft supplies more of those later levels by bundling the five-mission Eagle Watch pack, an add-on that PC players have to pay extra for. And if you tire of single-player missions, you can play the online version of the game against up to 15 opponents.

As fine a game as Rainbow Six is, its weak point is its artificial intelligence. The game strives for realism, but at times you'll wonder if your team members—and the terrorists—forgot to bring their brains to



Follow the Leader Team play is what Tom Clancy's Rainbow Six is all about.

work. Terrorists stand nonchalantly above the bodies of their cohorts, and your team members occasionally obstruct your view.

Macworld's Buying Advice These annoyances aside, Tom Clancy's Rainbow Six—a game that demands forethought as well as an adept trigger finger—is challenging and rewarding enough that it might just hold you hostage.—CHRISTOPHER BREEN

RATING: ★★★★★ **PROS:** Thoughtful and intense action; additional mission pack. **CONS:** Artificial intelligence can be too artificial. **COMPANY:** MacSoft (800/229-2714, www.wizworks.com/macsoft). **LIST PRICE:** \$50.

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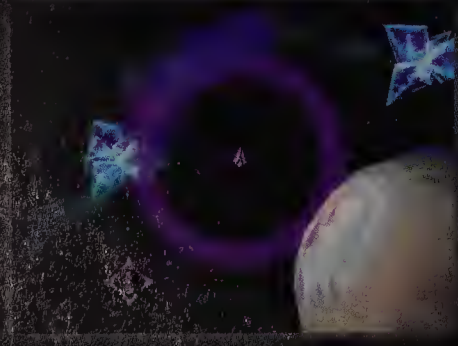
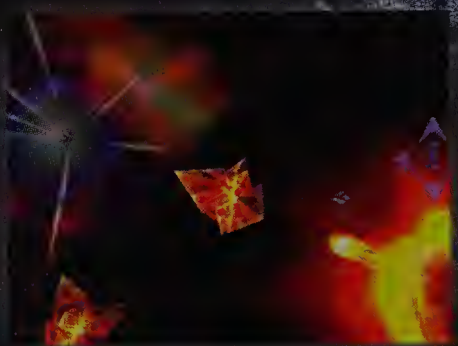
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The Game Room

Giving Birth to Games

AN INSIDE LOOK AT THE ORIGINS OF MAC GAMES

by Christopher Breen

The subject of s-e-x was never d-i-s-c-u-s-s-e-d by my family. Consequently, I, like many of my elementary-school colleagues, relied on the playground network to glean the facts of life. I examined and rejected many theories in my pursuit of the truth: I was fairly certain my suburban community was well out of the range of the white stork, and I knew for a fact there wasn't a cabbage patch within 50 miles of town.

The most improbable hypothesis came from Vince, a new kid who described a process so bizarre, so disgusting, that my classmates and I banished him from the four-square court for the better part of a week. It wasn't until George, a boy we'd known since kindergarten, smuggled in a book titled *Sex and You* that Vince's incredible tale was confirmed.

That search for the origins of life—or at least the origins of Petey Johnson's colicky little brother—changed my life. From this simple quest I developed a yearning to learn how things are made.

Because that yearning is so strong, it shouldn't surprise you that I've spent the last few weeks questioning several big guns in the Mac gaming business about how games are conceived and brought to market. Although the answers aren't as shocking as those from my elementary-school days, many are just as unexpected.

Conception and Birth

If you have an iMac or iBook, you have not only a cool computer but one that contains the work of Brian Greenstone, creator of the delightful 3-D games *Nanosaur* and *Bugdom*—games that are bundled with the iMac and iBook. Brian's company, Pangea Software, is one of the few outfits creating commercial games

for the Macintosh only. I couldn't think of a better person to ask about the genesis of a Mac game.

The first startling revelation was that, at least in Brian's case, games don't begin with a concept or plot—that this game will be about a bug that dashes through various levels avoiding enemy insects and freeing the fair ladybugs—but with the tools used to create the game. I'd always assumed that writing a game would be

Wrong again. According to Brian, a game's story line is a very fluid thing.

"Mighty Mike [sold as Power Pete by MacPlay] was originally a penguin game, *Nanosaur* was a descent-into-hell-with-various-weapons game, and *Bugdom* was originally a pinball game," he said.

I was also mistaken when I imagined that game designers spend most of their time sitting around spinning "Wouldn't this be cool!" scenarios.

Brian corrected me: "Since everything now is 3-D, the biggest obstacle is performance. This is really sad, actually. When I was doing 2-D Nintendo games a few years back, the biggest obstacle was making a game fun, but these days there's little time for that—dealing with the technology seems to gobble up all the time."

Brian and other game designers want their products to be entertaining, of course, but he's right. Computer gamers expect their diversions to be eye-catching and to play smoothly. It's no longer enough that a game be just fun to play.



like writing a screenplay—come up with a story, map out scenes, write it up, and lose your profits to a collection of Hollywood sleazebags. Apparently not.

"I typically get the inspiration for the game from the code itself," Brian explained. "I usually just start writing an engine and come up with interesting effects. Then the game ideas form from what I see the engine and effects can do."

OK, fine, the concept comes from the engine. Now that you have the concept, it's just a matter of refining it, right?

Adoption

Because Pangea self-publishes and produces only Mac games, its products go from lab to duplication with few intervening steps. Most of today's Mac games, however, are ported from the PC. How did they get here, and what factors do Mac publishers consider when bringing a game from the Dark Side to the Light? To find out, I turned to MacSoft Senior Product Manager Al Schilling.

continues

When I asked Al what factors are involved when considering a game, I was certain he'd say that MacSoft looks at PC sales and acquires the most popular PC game of the day. But it's a little more complicated than that.

"Three years ago I would have said the number one criteria in evaluating a potential port was unit sales on the PC," said Al. "Unit sales on the PC are really important, but we're making an effort to consider where the Mac market is going rather than just target the market as it stands today. The entertainment market is a constantly changing thing. Just think, by this time next year my kids may not want to play with Pokémon anymore. I wish!"



Madden's Missing Easter Egg Given the proper sign-offs, the 1984 Raiders-Chiefs Super Bowl half-time show would have shown Apple's "1984" commercial.

I understand that the Mac market is small potatoes to a lot of PC game publishers. I wondered how much bowing and scraping a company like MacSoft had to do to procure a game.

Al's response: "In the not-too-distant past we were begging at their doorsteps. We're in a somewhat more enviable position now. Almost half the time, the original developer or publisher contacts us. There is a growing awareness that there is some money to be made by selling a game on the Mac platform."

Gestation

Once the ink is dry on a contract to bring a PC game to the Mac, that game must be turned into something playable. Some of the best people in the business do just that at Westlake Interactive, Mark and Suellen Adams's legendary porting house.

Westlake begins a port by obtaining the original game's code. Because I view PCs and their software as something wholly alien, I was sure that the folks at Westlake spent the first month of a port peppering a game's original development team with queries. Not so. Mark explained that although he finds talking with the game's original developers helpful ("to make sure we have the latest source code and get answers to a few technical questions"), he tries to avoid burdening them with questions.

As for adding elements that make a game more Mac-like, Mark noted, "We love to add as many Mac-specific extras to a game as possible. The biggest con-

straint is time. Our first concern is to make sure the game plays as well as the PC [version], and then we try to improve any things we can."

And if that time exists, does Westlake add hidden treats?

"We often have great ideas for things to add but can't get permission from the PC publishers or from Apple," Mark said.

So how about an example of a cool addition that never came to pass?

"We had an idea to do an incredible Easter egg for Madden 2000—actually show the '1984' commercial during half-time if you played a game with the two Super Bowl teams from 1984. But we were never able to get all the permissions from the people involved to do it."

Checkup

Before a game goes out the door, it must

be tested. I've seen enough browser releases and newsgroup postings calling for beta testers to know that many products are tested by the public at large. I discovered, however, that this practice is starting to change for games.

Game companies that once relied on users to beta test their products are now relying on professional beta testing from companies such as Absolute Quality (AQ). Mike Jackson, Mac services coordinator for AQ, brought me up-to-speed on what his company does.

"We provide software developers with a wide variety of back-office support functions, like functionality testing and compatibility testing, translation and localization services, technical support, and user manual preparation and review," he said.

The number of testers AQ uses for a game varies. Mike explained that small, short-term projects may have a single tester, whereas a first-person shooter with multiplayer capabilities has had as many as 20 testers.

But I still didn't get it. Why, when any number of people would kill to beta test games for free, would a game company eat into its profits by paying for AQ's services? Apparently, free testing is worth exactly what you pay for it.

"Keep in mind that these 'free' testers don't have access to our scope of hardware and our network capability," Mike pointed out. "We've got dozens of machines, every type of modem, joystick, game pad, video card, etc. We can do cross-platform LAN testing; AirPort testing; and as a member of the Apple Developer Connection, we can offer testing using prerelease builds of the Mac OS."

Debut

There's one final stage—one where I can offer some personal insight. After a game is conceived, coded, acquired, ported, and tested, it's released to the public and to reviewers like me. My job is to play these games and get paid for it.

And going to bed each night with that knowledge, my friends, is a revelation far more satisfying than any secret whispered on the playground. **m**

Contributing Editor CHRISTOPHER BREEN pens *Macworld's* Daily Tips and iTips—Mac tips e-mailed to you each business day. To subscribe, go to <http://macworld.zdnet.com> and click on the Subscribing link under Newsletters.

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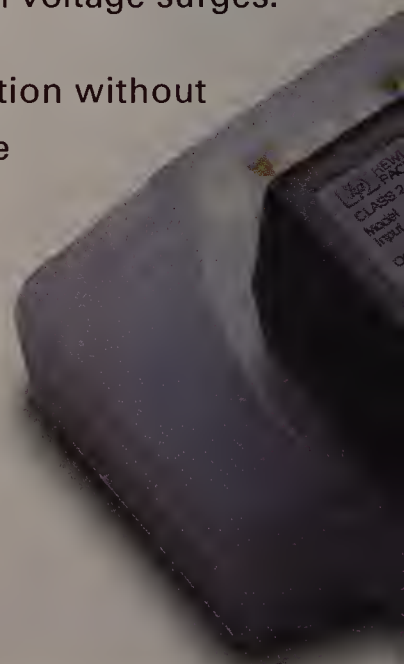
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MACWORLD'S

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Be Connected **and** Protected in the Wired World



PRIVACY GUIDE

Illustrations by Mark Ulriksen



PROTECT YOURSELF

Keep Your Personal Information Secure with This Comprehensive Guide

by Elliot Zaret and Scholle Sawyer



Illustrations by Mark Ulriksen

ONLINE



Welcome to the Wired World!

In a matter of hours, you book tickets for your next trip to Key West, buy a handful of travel guides from an online bookstore, and post an inquiry to the Internet newsgroup `rec.travel.i-am-going-to.florida`. Satisfied with all you've done so quickly and efficiently, you open your e-mail and—surprise! You confront 45 messages promising “HOT XXXXX!!!!” “Steamy Action in the Keys,” and the chance to make millions from the comfort of your own time-share. You also find five messages from people saying they read your Usenet message, went to your home page, found your home address, and have decided to visit.

As you're frantically deleting messages and wondering what you're going to do when strangers show up on your front porch, you begin mumbling to yourself: “That's it. I'm dropping off the grid and going to live in a cave. The Internet knows too much about me.”

How did this happen? The wired world has its advantages—but easy as it is for you to find information online, it may be just as easy for others to find out about you. This is a world where hackers want to steal your credit card number, where employers can easily look up your posts to online discussion groups or monitor your surfing at work, and where advertising “profilers” can track your movements and shopping habits. All sorts of information about you may be out on the Internet, ready for someone to connect the dots.

That's why we've assembled this guide to preserving your privacy online. If you're connected, you need protection. Since some invasions happen when you're not even at your computer, we'll also show you how to safeguard a Mac that's always connected to the Internet (see the sidebar “Make Your Mac Hacker-Proof”). With a little care and some helpful utilities, you can enjoy all the conveniences of the wired world and remain hidden from prying eyes.

Your IP Is Showing

Surfing the Web seems like a blissfully anonymous experience. No nosey salesperson eyes you when you buy toiletries from `Drugstore.com`, for instance, or winks when you buy Judy Blume's *Forever* from `Amazon.com`. But in many ways you're dramatically *less* anonymous online.

What They Know about You As soon as you connect to the Internet, you set up a relationship in which you both give and receive. Every time you download a Web page, your browser sends the Web server information about what Web browser and operating system you're using, the URL of the page that referred you to the site (if you simply typed the URL, the Web site gets no information about the last site you visited), and the IP address (a unique identifying number your computer uses on the Internet) of your system.

This information is usually recorded in a *log*, a file that details every page a Web server sends out to readers—and tracks the IP addresses that retrieve the page. Sophisticated programs can process log files and piece together a profile of your visit: which pages you visited, how long you stayed on each one, and even what site you headed for when you left (if you clicked on a link on one of the Web site's pages).

Once someone has your IP address, he or she can also figure out generally where you're surfing from. For example, using the Lookup Domain feature in Stairways Software's (`www.stairways.com`) \$35 shareware program, Anarchie 3.7, you can enter an IP address and find a person's domain.

What Cookies Tell Them Some sites go further and use *cookies*. A cookie is a small piece of information the site wants to store on your hard drive—perhaps a unique number or user name identifying your computer. Your browser stores all the cookies together in a cookie file.

Sites can easily track what you do during one visit, but it gets more complicated when you go away and come back later. That's where cookies come in. Cookies allow sites to keep track of who you are even if you haven't visited for a while. This is how `Amazon.com` recognizes you and serves up book recommendations when you return to the site, without ever asking you to log in. This is also how your `my.yahoo.com` home page opens to your favorite news and stock quotes and

how www.nytimes.com remembers your user ID so you don't have to log in each time you read the *New York Times* online. If you've ever registered on a site, it may have associated your name, address, and e-mail with all this other information.

Who's Watching Most cookies simply make surfing more convenient. The exception is when sites allow a separate company, usually an advertising service, to place its cookie on your computer from within a site and then use that cookie to track you from site to site. With this knowledge, the advertising companies—known as profilers—can build a comprehensive profile of your surfing habits and use it to put ads targeting you on their partner sites.

The profilers argue that their activity is harmless and that they don't really know who you are. Besides, they say, they're basically doing you a service by tailoring ads so you see only items of interest. But take the example of the company DoubleClick, a very popular profiler many companies (including *Macworld*) have used. It became the focus of legal and media scrutiny for privacy invasion after it bought a direct-mail database called Abacus Direct last year.

The Abacus purchase gave DoubleClick the ability to take

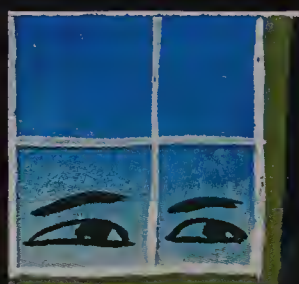
your employer to do just that while you're on the job. See the sidebar "Your Cubicle Is Not Your Castle" for more details about the limitations of your privacy at work.

Keep Your Surfing to Yourself

If all this gives you the creeps, you can take a few protective measures. Most involve a trade-off between convenience and privacy.

Surf Anonymously One way to keep people from monitoring your browsing is to hide it from them. For this, you can go to a nifty Web site called Anonymizer (www.anonymizer.com) and use its Anonymizer surfing service. Enter a Web address you want to visit—the service uses its servers to mask your identity as you continue to surf. Surfing anonymously is the *only* way to stop transmission of your IP address when you visit a site.

You can try this service free, which means you'll experience a slight delay before linking to sites, or pay for a Premium account (\$14.95 for three months or \$49.95 for a year) for quicker performance. The site also plans to offer Premium members selective blocking of Java applets and JavaScripts. The Anonymizer site provides free anonymous e-mail (see the accompanying feature "Protect Your E-mail") and an anonymous ISP for \$59.95 a month.



Profilers such as DoubleClick may draw heat when they track your movements online, but it's perfectly legal for your employer to do just that.

profiles a step further. The Abacus database contains nearly 3 billion transactions made at stores such as Bloomingdale's, as well as those customers' names and addresses. With that information, DoubleClick could connect the dots and link your surfing habits with your name, address, phone number—and your offline shopping habits as well. That was too invasive for the Federal Trade Commission. This past February, it launched a general inquiry into DoubleClick's practices. The company responded by promising not to link the two databases—for now.

Companies such as DoubleClick may draw heat when they track your movements online, but it's perfectly legal for

Watch Your Cookies If anonymous surfing seems extreme, your next choice is simply to accept that sites know your IP address and to get wise about cookies. (If you dial in to your ISP, it may assign you a different IP address each time anyway.)

Most of the major reputable sites offer an "opt-out," or the ability to request that the site not track you with a cookie. You'll usually find this option on a site's privacy-policy page. The Center for Democracy and Technology (CDT) offers a Web site (<http://opt-out.cdt.org/online/>) to help you through the process at many of the top portals, profilers, and e-commerce sites, such as DoubleClick and Yahoo. But opting out

PRIVACY RESOURCES

Electronic Frontier Foundation	www.eff.org	Privacy news, voluminous resources, and discussion groups from one of the premier organizations working for online privacy rights.
Center for Democracy and Technology	www.cdt.org	Here you'll find the Operation Opt-Out tool, which helps block cookies from many major sites. This site also offers news and legislation tracking.
Electronic Privacy Information Center	www.epic.org	This is a good source of legal information. This site also offers book recommendations.
The Federal Trade Commission	www.ftc.gov/bcp/menu-internet.htm	The federal government's advice on protecting yourself against scams of all types.
Social Security Administration	www.ssa.gov/pubs/idtheft.htm	The first place to go if you suspect you may be the victim of "identity theft." The hotline number is 800/269-0271.

takes a bit of time and effort—and may not actually work, since it's voluntary on the part of the companies.

Current versions of Microsoft Internet Explorer and Netscape Communicator have security features that keep sites from obtaining your e-mail address or accessing your files without your permission, and every browser offers you the ability to turn off cookies.

Turning off cookies is a great idea in theory that usually fails in practice. First off, some e-commerce sites *require* cookies to keep track of what's in your shopping cart. If you turn cookies off, most browsers will beep at you repeatedly—sometimes multiple times on a single Web page—warning you that the site is trying to send a cookie and asking you to accept or reject the file. Needless to say, this makes browsing all but impossible.

Microsoft's new Internet Explorer 5.0 (425/882-8080, www.microsoft.com/mac/ie/) improves on this process significantly, allowing you to block cookies without all the beeping. If you want to know what cookies you've picked up in Internet Explorer, open Preferences and select Cookies from the commands on the left under Receiving Files. The list of cookies appears on the right. You can then select any you don't want and press Delete.

Use Cookie-Zapping Software For Netscape users and people with older versions of Internet Explorer, a few programs can help manage cookies. Some offer other features that make them worthwhile for Explorer 5.0 users, too.

Webroot's \$29.95 MacWasher (800/772-9383, www.webroot.com/macwasher.htm) is the most thorough of the bunch (see *Reviews*, April 2000). This shareware utility cleans your cookie file at selected times or during start-up or shutdown. MacWasher allows you to select cookies and files you don't want deleted so you can still log in to your favorite trusted site.

If you don't want to pony up the money for MacWasher, two freeware programs can help: 1.0 Technologies' No Cookie 2.0 (www.onepointoh.com/products/NoCookie/) and MagicCookie Monster (<http://download.at/drjsoftware>), from Dr. Jon's Software. No Cookie allows you to see what's in your cookie file, delete its contents, and disable the file so it can't save new cookies but won't cause your browser to keep beeping at you. The only problem with No Cookie is that it basically offers an all-or-nothing approach. You may want some of your cookies that personalize certain pages.

While No Cookie uses a machete, MagicCookie Monster wields a scalpel. With this utility, you can edit your cookie file, selectively deleting any cookie you don't want. Of course, the flaw here is that you can't disable the cookie file, so those nasty cookies will return soon enough.

One solution is to use the two in tandem. Use MagicCookie Monster to delete cookies you don't want; then run No Cookie to disable the cookie file and keep new cookies out. This allows you to keep the automatic registrations at select sites of your choosing.

Zap Everything Another solution for aggressive advertisers is to use Override Software's \$25 Lightspeed Surfer (www.override.com/lightspeed/), which blocks not only cookies but also *advertisements*. With this shareware utility running, you see a box with a plain text link in place of banner ads—handy if the Web's commercial bent overwhelms you.

Lightspeed Surfer can also block Java applets, JavaScripts, and plug-ins—which can bring their own host of security problems, though most of those problems have occurred only on Windows computers. Of course, this kind of heavy-duty protection has its price—you lose some of the nifty functions those Java programs provide, such as streaming stock quotes and real-

Your Cubicle Is Not Your Castle

What you do at work is *not* your own business. It's perfectly legal for your company to monitor your surfing and rifle through your e-mail while you're on the clock (see the accompanying feature "Protect Your E-mail"). And it may do just that—according to a 1998 study by the International Data Corporation (IDC), 45 percent of all companies and 17 percent of Fortune 1000 companies use software to monitor their employees. IDC predicts that number will jump to 80 percent by 2001.

Is the Boss Watching? Mac network managers can use software such as Netopia's netOctopus 3.5 (800/803-8212, www.netopia.com) for this purpose. Network managers can also see where you surf without using any software at all—by simply checking the logs on the corporate proxy server.

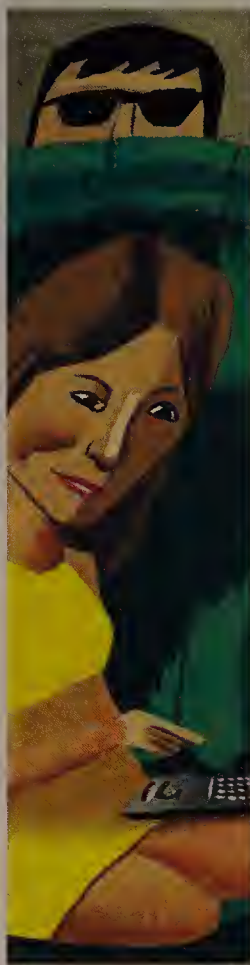
Tidy Up Your Hard Drive But your employer doesn't have to spy on you over the network to see where you've been. Your own hard drive will quickly spill your secrets. Microsoft Internet Explorer and Netscape Communicator both keep cache files, which speed surfing by storing images and pages you have visited. These files also provide a road map of where you've been. Internet Explorer's History file keeps a detailed record of your movements as well. If you're concerned your boss might mistakenly confuse that research you did at Amazon.com or ESPN.com for pleasure surfing, you can erase your tracks.

To do this in Internet Explorer, choose Internet Preferences from the Edit menu. Click on Web Browser and then on Advanced. Click on Empty Now to clear your cache; to delete your history, ask it to remember 0 places visited. In Netscape, go to the Edit menu and select Preferences. Choose the Advanced option and select Cache. Click on the Clear Disk Cache Now button.

You can also use a program such as MacWasher to get rid of all trace of your cache file or Internet Explorer History file. This program even deletes the Recent Files folder in your Apple Menu and empties the Trash.

Use a Password When it came out that former CIA director John Deutch had all sorts of secret intelligence files on a Mac at his house, the account also revealed that someone using the computer had been surfing porn sites. A security report said the sex surfer was most likely someone else—possibly a housekeeper—and Deutch was probably not home at the time.

Ignoring the obvious question of whether the sex surfer therefore had access to the classified CIA files, the former head spook could have avoided the embarrassment of sexual innuendo with OS 9. A simple step, such as using OS 9's Voice-print feature (see *Secrets*, May 2000) to lock intruders out of the hard drive, could at least ensure that you don't get in trouble for what you didn't do. If you use text passwords, include capital and lowercase letters, as well as numbers and punctuation marks.



Make Your Mac Hacker-Proof

When you're constantly connected to the Internet through DSL, cable modem, or other high-speed technologies, the Internet is constantly connected to you. Millions of people can probe your Macintosh over an always-on connection—24 hours a day, 7 days a week. Do you *trust* all those people? Of course not!

You use a Mac, so you're immune to many problems that plague the Windows world. In its default configuration, the current Mac OS is not vulnerable to spammers or other miscreants. For instance, no one can hijack your computer and turn it into a "zombie attacker," as happened with many individuals' PCs in the recent denial-of-service attacks against Yahoo and other big Web sites.

Now that you're using the Internet more ambitiously, though, it's important to make sure you aren't exposing your computer—or yourself—to unnecessary

risks. If you're running an e-mail or Web server, you'll want to protect your data as best you can from online thugs. One answer is firewall software.

Ports of Call Internet programs communicate using ports. These aren't physical connectors on your computer, but numbered, software-based sockets on your Internet connection. Many port numbers are standardized. Port 25 sends mail; Web servers typically occupy port 80. Servers and some Internet programs listen on specific ports and respond to incoming connections: if you enable Personal Web Sharing, by default it listens for connections on port 80.

Firewalls can enable or block connections on specific ports and often for particular Internet addresses. Let's say you want to use Personal Web Sharing (or Mac OS 9's Internet-capable File Sharing) to access files on your home computer from work. In addition to password-protecting your Mac,

you could configure a firewall so it only permits access to port 80 (Web Sharing) or port 548 (File Sharing) from your work computer. This way, you could access your files from work, but the firewall would deny any attempt to connect to your Mac from other computers elsewhere. (However, this would also prevent you from connecting from the cybercafé down the street.)

Options Your always-on Internet connection may use a simple hardware router—particularly if you have more than one static IP address. If so, that router may offer basic firewall capabilities, but you might have to configure it using a Telnet client, and it probably has little or no logging capability.

Open Door Networks (541/488-4127, www.opendoor.com) offers the \$60 DoorStop Personal Edition (see *Reviews*, June 2000), a simple firewall designed to protect the Macintosh on which you install it. DoorStop's interface is occasionally confus-

time chat. Also, your browser can already turn Java and JavaScript on or off on-the-fly, so this feature may be overkill.

Your Own Worst Enemy

Unfortunately, you are your own biggest security risk. Any data you put in an online form, especially personal information, is fair game for advertisers or hackers.

Most information—whether it be e-mail, a photo, or items you type into a form—travels across the Internet in *packets*. These bounce from server to server until they reach the right computer. Hackers have programs that can sit on a server and read all the packets that pass by, so a hacker can intercept information at will.

Protect Your Passkeys It's easy to give away information without even realizing it. The three passkeys for your credit card and bank accounts are most likely your mother's maiden name, your date of birth, and your Social Security number. You'd *never* tell anyone all this, right? Think again.

If you're a fan of genealogy, for example, you may have posted your mother's maiden name on your home page or on a genealogy site such as FamilyTreeMaker.com. You also may have given your date of birth in these places or when you registered for any number of sites.

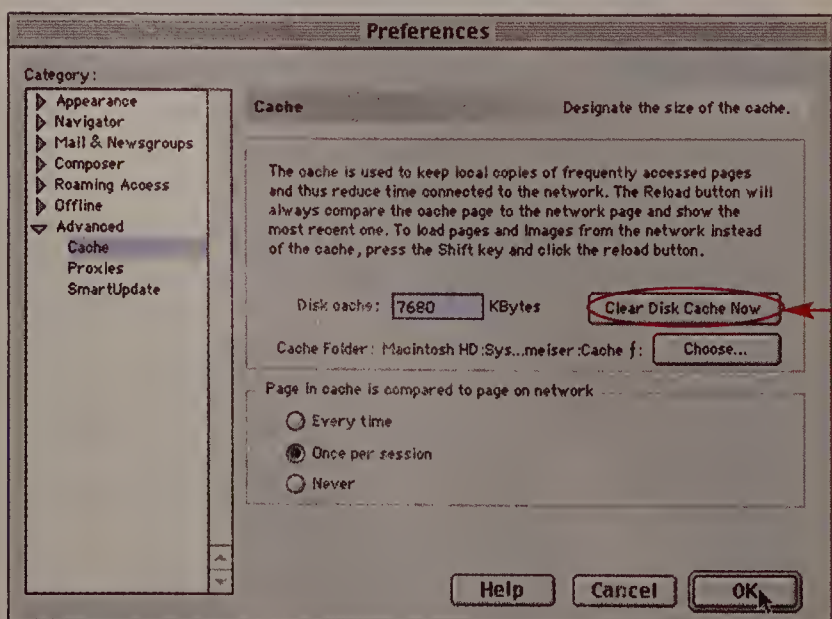
Your Social Security number is probably the safest (and most crucial) of the lot, so protect it as best you can—*do not* give it to companies unless you must: for example, when you deal with the DMV or a creditor. If you suspect someone has intercepted your personal information and stolen your identity, move fast (see the table "Privacy Resources").

Use Secure Sites In some cases, however, you may feel that giving away some information in exchange for certain services is well worth it. In that case, follow some simple precautions. Require a secure site whenever you give *any* personal information. You have two ways to check: the key or padlock in the bottom left corner of your browser window should be locked; and the URL should begin with *https://* rather than *http://* (the *s* is for *secure*) if the connection is secure.

Don't Let Others Connect the Dots

We've talked about several ways people can obtain information about you on the Web, but one of the biggest dangers is how easily they can put all this information together. Take, for example, the following popular Internet legend.

As the story goes, BigHank53 sends a random e-mail to a site, calling its creators stupid. These levelheaded chaps search



A Clear Cache Your browser's Cache file keeps a record of every Web page you've visited. To erase this trail in Netscape Navigator, go to Preferences and click on Clear Disk Cache Now.

ing, but configuration is straightforward, and DoorStop works with common services like Web Sharing, File Sharing, Timbuktu, Retrospect, and FileMaker. An enhanced \$300 Server Edition offers more-flexible configuration options for Macs functioning as Internet servers.

Intego's \$150 NetBarrier (305/868-7920, www.intego.com) also protects the computer on which you install it but offers an elaborate interface with traffic-monitoring gauges and configuration options (see *Reviews*, December 1999). Unlike DoorStop, NetBarrier can filter incoming and outgoing traffic, so you can prevent credit card or Social Security numbers from leaving your computer. NetBarrier protects against some denial-of-service attacks and detects port scans, which usually mean a miscreant is looking for an exploitable service. This program



also overcomes a weakness in Open Transport by scrambling TCP sequences so it's tough to hijack an Internet session. NetBarrier is overkill for most people, but it offers unique features.

If you're connecting multiple computers to the Internet, software routers such as Vicomsoft's \$100 SoftRouter (800/818-4266, www.vicomsoft.com) and Sustainable Softworks' \$90 IPNetRouter (www.sustworks.com) add firewall capabilities for an entire network. However, both products require more technical know-how.

Safety Strategies There are two basic approaches to a firewall: you can selectively enable connections or selectively deny connections. The former approach is more conservative—the firewall blocks *all* connections except the types you specifically permit. The latter approach is less secure, but

it's also less hassle. You don't have to remember to use Passive FTP (in the Internet control panel's Advanced settings) or reconfigure your firewall if you install something, say, America Online Instant Messenger.

Breathe Easier A firewall cannot protect you from every Internet threat—you can still receive Trojan horse programs or virus-infected documents via e-mail, and Web sites still try to track your every move—but it can prevent some abuses of your Mac.—GEOFF DUNCAN



the Web, probably using a search engine such as AltaVista, for his Hotmail address. (For tips on searching the Web, see "The Macworld Web Searcher's Companion," May 2000.) He's put this e-mail address on his home page, along with his résumé, information about his family, and his activities with a church youth group. The site's creators then do a search of Usenet discussion groups and discover BigHank53's e-mail address somewhere else—on postings to adult newsgroups.

After searching for the phone number of his church and employer, they have all the information they need to blackmail poor BigHank53. Their price? He must put a blinking banner that says "I am stoopit" on his home page. Is this a true story? Probably not. The scary thing is that it *could* be.

Discussion Groups Are Not Private Take a lesson from BigHank53. If you post to discussion groups, know that your posting gets archived and that people can search for what you've said by typing your name on a site called Deja.com (formerly Deja News).

This site archives every posting to every Internet newsgroup in searchable form. The premise of Deja.com is that you can see people's comments about a product you may be considering buying and use the archive as a grassroots *Consumer Reports*.

People can use this service for different purposes, however. Anyone from crazy site creators to potential and current employers, for example, can search for your name or e-mail address. If you're making nasty remarks about your coworkers or have a penchant for violent or sexual materials, they may find that enough grounds to fire you or not to hire you. This holds true if you keep an online diary or Web log—if it's on the Web, it's not private.

Watch Where You Post Your E-mail Address There's another reason for wariness when you post to discussion groups. Spammers use programs that mine these newsgroups and collect e-mail addresses, and then they flood you with spam about the latest get-rich-quick scheme or porn site.

If you want to avoid spam, or don't want your Usenet postings forever on display with your identifying e-mail address, get an anonymous Web-based e-mail address from a provider such as Yahoo Mail or Hotmail. These are also great to use for all online registrations—the source of some spam.

To really throw the dogs off your scent, sign up for a couple different e-mail addresses and rotate them. This keeps anyone from developing a profile, even on your anonymous e-mail. If you don't like the idea of logging into all those accounts, use a secure (and free) personal information portal like Yodlee (www.yodlee.com) to check all your e-mail addresses at once. There's another option if you want fellow posters to be able to write you but want to outwit spammers' programs—you can also insert a word or two into your e-mail address and include instructions for people to delete them before writing—for example, reader_nospam@macworld.com. Never put these camouflage e-mail addresses on a personal home page with your name on it.

The Last Word

The precautions you choose to take really depend on how much privacy you require. In all likelihood, you could surf and post freely your whole life without dire consequences—but why take the chance? A few simple measures can put you in control of what people know about you and what they don't. **m**

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ADOBE WEB
COLLECTION


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PROTECT YOUR

Keep Your Private Words from Prying Eyes

by Tom Negrino



E-MAIL



E-mail is about as private as undressing with your curtains open. You may think you're having a private moment, but the reality is quite different. The steamy love letter you sent to your sweetheart, the joke about your manager's new hair-cut, and the résumé you sent to your company's competitor may all have passed under the eyes of your boss, as well as those of the systems supervisor and a few other unintended recipients. The fact is, thanks to modern technology and the approval of the courts, your employer can easily—and legally—keep tabs on everything that passes through your e-mail out-box at work. It's also not especially difficult for a hacker, your ISP's mail administrator, or a coworker to intercept and read your e-mail. Thankfully, you can shield private messages from public scrutiny. With some security know-how and our e-mail tips, you can fight off the Big Brothers of the world.

The Power and the Peril

To understand why your e-mail is vulnerable, you must first understand how your messages move through the Internet. E-mail programs such as Microsoft's Outlook Express and Qualcomm's Eudora Pro give you a feeling of control over your correspondence. As the mail comes in, you organize it, delete some of it from your mailbox, and fire off replies to friends. Because this all happens in a matter of moments, you have the illusion of beaming your letter directly to the recipient's computer.

In most cases, however, your out-box is only the first of several stops the message takes before reaching your recipient's in-box. E-mail follows a routing process similar to the postal system's—only without the added protection of a sealed envelope (for details, see the sidebar "E-mail Odyssey"). Each stop along the way offers an opportunity for prying eyes.

Gone Today, Here Tomorrow In the years since you started using e-mail, you've probably sent and received thousands of messages. Like most of us, you may assume that your messages of yesteryear have disappeared forever into the electronic ether. Just because you've deleted an e-mail from your system, though, doesn't mean it's really gone. With most e-mail applications, deleted messages live in a readily available Trash folder until you exit the program (or, in some cases, until you empty the folder manually). And even after you clear the Trash folder, the data remains on your hard disk until other files overwrite it.

Assuming you've managed to wipe a message clean from your own computer, chances are a copy still lives on your recipient's hard drive. If you sent or received the message at work, your employer may have backup tapes containing your messages (whether the company has backed up your personal hard drive or not). And if you send and receive messages from home, your ISP probably has copies of your e-mail, because a responsible provider backs up its mail servers regularly. It's also possible for hackers to intercept the mail stream going to or from your ISP's servers. All of these copies are beyond your control.

Nosey Neighbors Snoopers have many ways to see your e-mail. The easiest is to sit down at your desk and open your mail program when you're somewhere else. Programs such as Outlook Express and Netscape Messenger require passwords only when downloading new mail—not for the program as a whole. (Of course, if you've set up your account to remember your password, you don't have even this minimal level of security.) This can really be a problem if you ever share a computer with others in your office or at an Internet café. Unless you always take care to log out properly, the next person to sit down has complete access to your in-box. When using a public computer, you should delete all messages from your in-box and remove your account information from the Preferences panel before exiting the mail program. If you don't want to delete your messages permanently, open your e-mail preferences and select Leave A Copy Of Messages On Server before downloading your mail. (For more tips on erasing your e-mail trail, see the accompanying feature "Protect Yourself Online.")

Whose Mail Is It, Anyway?

But why should you care if people are reading your e-mail? You probably don't transmit government secrets on a regular basis. In fact, most e-mail messages are simply routine correspondence with coworkers, family, and friends, of interest only to you and them (and sometimes not even to them!).

Although the spooks at the National Security Agency may not care about the racy joke you just forwarded to all of your coworkers and half of Michigan, your boss probably does. And if you're not careful, your next off-the-cuff rant or tasteless barb could land you right out of a job.

Their Ball, Their Rules You probably assume that e-mail you send from work belongs to you. Unfortunately, the U.S. courts

Don't Take Candy from Strangers

A common concern of people new to e-mail is the threat of a computer virus hitching a ride on that incoming mail from Grandma. If this describes you, sit back and smile appreciatively at your Mac. For the most part, Mac users have little to worry about, as relatively few Mac viruses are circulating. This is because, like the majority of computer users, most of the pinheads who create computer viruses use Windows machines. Thus they write code that specifically exploits the soft underbelly of that platform. Because Windows programs don't run on the Mac OS, neither do most Windows viruses.

That's not to say you can't get a Mac virus by e-mail. It's possible—and like most viruses, it would come as a file attachment. Here are some tips for protecting your Mac from pesky, uninvited guests.

Who's There? Always approach e-mail attachments with suspicion. If you double-click on an infected file, you could download a virus right to your Mac. To prevent this, most e-mail clients warn you before launching attached programs. Keep in mind that not all viruses come directly from malevolent strangers; some can attach themselves

to e-mail messages without the infected sender's knowledge. Here's a good rule of thumb: Never open an attachment unless you know the sender and have a pretty good idea of what the file is.

Macro Mischief One troublesome and highly infectious e-mail microbe is the macro virus. Macros are little snippets of program code used by Microsoft's Office suite; they allow documents to perform useful tasks such as running a series of calculations in an Excel spreadsheet. Unfortunately, hackers can write evil macros.

One particularly annoying macro virus that hit the Mac arrived through attached Word documents and transformed all Word documents on the user's hard drive into templates, rendering them uneditable.

Fortunately, because of differences in the operating systems, the most vicious macro viruses have their worst effects on Windows machines. Although to date no one has discovered a macro virus on the Mac that will *destroy* data, it pays to be careful.

E-mail Inoculation To make sure your Mac isn't infected already, and to safeguard your system in the future, consider buying a virus-protection program, such as Symantec's \$70 Norton AntiVirus (800/497-6180, www.symantec.com). Make sure to keep the virus definitions up-to-date.

Fabled Infections If you get a message from a friend telling you not to open any e-mail containing the subject line "Good Times"—ignore it. This is one of the oldest myths circulating on the Net. An e-mail message itself is just plain text; it cannot fry your hard drive, steal your financial data, or check to see if you have spinach in your teeth. (You can keep track of the latest virus hoaxes at www.urbanlegends.about.com.)



don't agree. Recent legal decisions confirm that when you use your company's computers, network, and Internet connection to compose and send e-mail, your mail belongs to—you guessed it—the company, not you. This includes messages to your mom, your better half, and the *Buffy the Vampire Slayer* message boards.

Many organizations use monitoring software to see how employees are using the company's computers and fast, expensive Internet connections. A wide variety of monitoring software is now on the market. Some simply monitors the frequency of e-mail and Internet use, looking for employees who may be spending too much time online. Other programs can scan messages for keywords such as *sex* or *résumé*, saving any suspect messages for later review or even blocking them altogether. The practice is already common; a report by the American Management Association showed that nearly 30 percent of the companies it surveyed were monitoring e-mail in early 1999. As more and cheaper monitoring software becomes available, the likelihood that your employer will scrutinize mail increases.

Why would your company even bother to monitor your e-mail? To protect itself, for one thing: The company can be held liable for what you say if it gets sued for sexual harassment or job discrimination. Say you don't like an obnoxious co-worker, and you e-mail some tasteless jokes about him to a friend in your company. A few years later, the obnoxious coworker gets fired and sues the company. His lawyer demands copies of all e-mail that mentions him, and next thing you know, your joking (if a bit mean-spirited) old message becomes exhibit A in the lawsuit as proof of a hostile work environment.

This isn't just theoretical; over the past several years, demand for e-mail records has become one of the primary requests in the discovery phase of lawsuits. Joe Kish, a partner at the law firm of Severson & Werson, teaches legal seminars on methods of electronic discovery. "People seem to drop their guard when they send e-mail," Kish comments. "It's become an incredible legal resource for both plaintiffs and defendants."

Examples abound. As we wrote this article, the U.S. Justice Department opened up a criminal investigation to determine whether the Clinton White House had deliberately withheld potentially embarrassing e-mail from congressional subpoenas. And Bill Gates knows all about e-mail messages returning from the electronic grave to haunt you. In the Microsoft antitrust trial, Department of Justice lawyers skillfully used old e-mail he wrote and received to undermine the credibility of his videotaped testimony. Interestingly, Gates and his correspondents wrote many of these messages *after* the government filed suit, showing how even someone as savvy as the Microsoft king thought of e-mail as ephemeral.

Loose Lips Sink Careers Lawsuits aren't all your boss may worry about. Here's another possibility: Say you use the company e-mail system to gripe about your working conditions and coworkers to a friend. When your next performance review comes up, your supervisor pulls out the e-mail and denies you a raise or promotion because of your poor attitude. An employer has the right to use e-mail records to monitor employees' job performance. That's because the courts have held that companies have a legitimate interest in assuring the quality of their employees' work and in protecting themselves against workplace theft and fraud. If one of the factors in your performance evaluation is how you handle teamwork, negative e-mail could affect your standing.

Keeping Your Mail Private

Although a responsible employer should inform its workers that it monitors e-mail, companies may or may not be legally required to do so, depending on the laws of the state where the company is located. The best way to avoid getting in trouble with e-mail is to be cautious about what you write when you're at work. Kish says, "Treat your e-mail as if it were as important as any other business correspondence. Don't let the ease and convenience of sending e-mail replace common sense."

At times, though, you may have a legitimate need to send out sensitive material such as client correspondence or business plans. You *can* protect the privacy of these messages, but it's going to take a little work.

they don't verify the data, so you could provide bogus information. Keep in mind, however, that many newsgroups object to the use of fake identities for posting messages.

Don't think that you're untraceable just because you haven't associated your real name with an account. When you send a message through Hotmail or Yahoo, the Web site places your computer's IP address (the identifying number that your system uses on the Internet) into the message header. Many work-based computers, as well as home computers with DSL or cable connections, have a fixed IP address that points directly to you. Even if your computer has a dynamic IP address (one that changes each time you log on to the Internet), your ISP can check its server logs to find out which user occupied a



Even after you've deleted your messages, chances are a copy survives on another computer. Think privacy laws protect you? Think again.

Hiding behind a Web Site For casual purposes, you can get the privacy you need from a Web-based mail service such as Hotmail or Yahoo Mail. These free services let you send and receive e-mail from their Web sites, so you can write personal stuff at work without using your company e-mail account. Because Web sites store the mail on their own servers—not on your company's—your employer can't get access to the data through monitoring software or a backup copy. That doesn't mean your company doesn't still "own" the mail you send from work, but in practice it reduces your employer's ability to get at it.

The Web-based accounts also provide a degree of anonymity. When setting up your account, you select a user name. It doesn't have to be your real name—you could call yourself *secretfella@yahoo.com* or *mizhushbush@hotmail.com*. These services generally ask for your name and some address information, but

specific IP address when a particular message was sent.

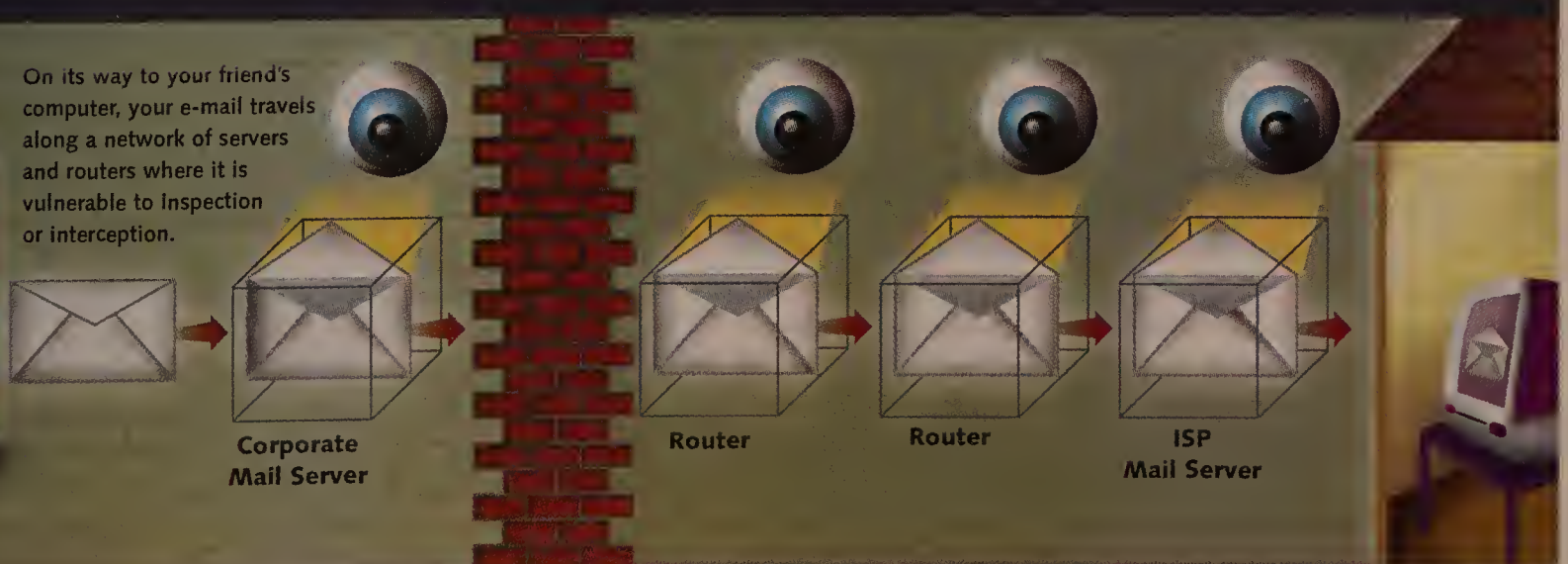
Become Anonymous At times, you may need complete anonymity in e-mail communications. For example, you might be a whistle-blower reporting an illegal act to the authorities. If you want to make sure that absolutely no one can trace your messages back to you, send them through a remailer service. Remailers strip all identifying address information from outgoing messages, then send them on to their destination, often encrypting them in transit.

You can send messages to a remailer using your regular e-mail program or through a Web interface, such as the one at the Anonymizer Web site (www.anonymizer.com).

Naturally, the downside to having all of your address information stripped off your messages is that the recipient has no way to respond. Also, the e-mail can take a long time to go

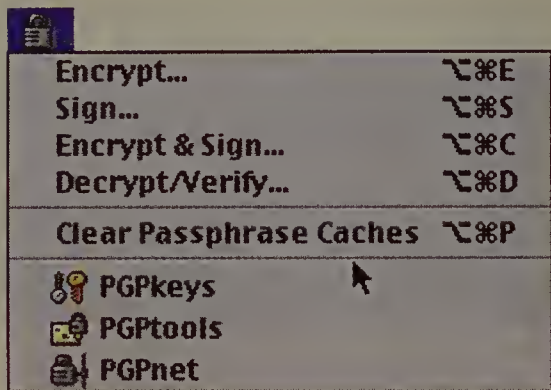
E-MAIL ODYSSEY

On its way to your friend's computer, your e-mail travels along a network of servers and routers where it is vulnerable to inspection or interception.



Padlock Your E-mail with PGP

Encryption gives you the highest possible level of privacy protection. One of the most popular encryption tools is PGP (Pretty Good Privacy). Used in conjunction with many popular e-mail programs, this freeware encryption package can provide everything you'll need to encrypt, authenticate, and decrypt your most sensitive correspondence. Our guide walks you through setting up and using PGP with Microsoft's Outlook Express 5.02; however, the process is similar with other e-mail programs.



PGP Tool Kit After you install the PGP package, this encryption menu appears in your e-mail program.

Crypto in a Really Small Nutshell

PGP is based on a technology called *public key cryptography*. It uses two *encryption keys* (long strings of letters, punctuation marks, and numbers) that work together to maintain security. You can give your *public key*, which encrypts data, to anyone you want. Your *private key*, which stays in your possession, unscrambles the data encrypted with your public key. Anyone with a copy of your public key can encrypt information so that only you can read it. You can collect other people's public keys and add them to an encrypted file called a *keyring*.

PGP can also affix a digital signature to documents you send. This allows recipients to verify that messages actually came from you, not an impostor. (For an explanation of how PGP works, see the online sidebar "PGP Basics" at www.macworld.com/2000/07/features.)

Picking Up Your Keys You can download the freeware PGP software from <http://web.mit.edu/network/pgp.html>. After unstuffing and installing the package, you'll end up with a folder that includes the PGP Tools

program, which lets you work with files and folders, as well as the PGP Keys program for managing your encryption keys. The package also adds PGP tools to your control-click contextual menu, allowing you to encrypt and decrypt items from the desktop.

Before you can begin encrypting e-mail, you must first create your public and private keys. The PGP Key Generation Wizard, which launches when you install PGP, walks you through this process. When setting up your keys, you'll have to establish a pass phrase (which is like a password but should be longer and therefore more secure). Take great care here—if you forget your pass phrase, nobody in the universe can retrieve it for you. When you have the keys, upload your public key to one of the Internet's public-key servers so that others can use it to send you mail.

Next, you'll need to obtain the public keys of the people to whom you want to send encrypted messages. You can use the PGP Keys program to retrieve their keys from a key server, or each correspondent can send his or her public key to you in a plain-text e-mail message. To save public keys to your

through—one test message took more than a day. Keep in mind that remailers won't protect you from unintentionally identifying yourself through your writing style or subject matter.

Scrambling for Privacy

Perhaps you don't need absolute anonymity, but you don't want anyone except your intended recipient to read your e-mail. You may, after all, be exchanging confidential company information with your business partner. For cases like this, you should look into encryption software. Encryption scrambles plain-text messages using a mathematical algorithm, so that only the intended recipient can read them.

The Weak and the Strong One of the world's experts in cryptography, Bruce Schneier, once said, "There are two kinds of cryptography in this world: cryptography that will stop your kid sister from reading your files, and cryptography that will stop major governments from reading your files." As a Macintosh user, you have ready access to both kinds.

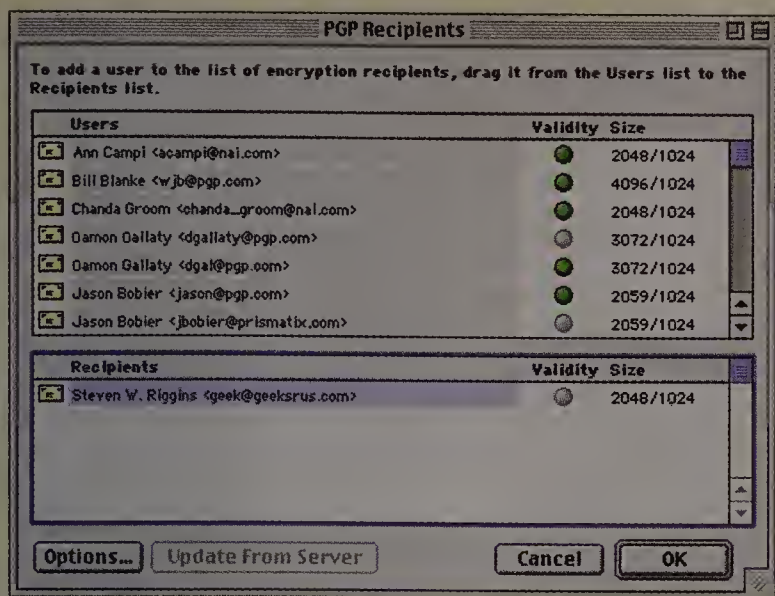
You'll find relatively weak cryptography in Aladdin Systems' DropStuff (831/761-6200, www.aladdinsys.com). This shareware program lets you compress and encrypt one or more files or folders into an archive file using a password. If you're using Apple's \$99 OS 9 (800/692-7753, www.apple.com), you don't need DropStuff, as OS 9 includes a similar security feature for files. To use it, choose Encrypt from the File menu in the Finder and select a password.

Encryption strength is measured in bits—the more bits a

cipher has, the tougher it is to crack. The protection factor in DropStuff is fairly low, with only 40-bit encryption. By comparison, the level of encryption in most online banking transactions is 128 bits. Still, 40-bit encryption will baffle all but the most determined and sophisticated code-crackers. One big drawback to both DropStuff and OS 9's encryption features is that they work only on files or folders; you can't encrypt individual e-mail messages unless you save them as file attachments. Also, you must agree on a password with the recipient before you send the encrypted archive. If you exchange this password in an *unprotected* e-mail message, you'll shoot a giant hole in your carefully constructed wall of security.

Another option is a Web-based encryption service. These allow you to encrypt e-mail, which your recipient can then pick up securely. For example, Ziplip (www.ziplip.com) lets you compose your message on its secure Web site; the service then encrypts the e-mail and stores it on the Ziplip server. Ziplip sends the e-mail to the recipient, announcing that he or she has a Ziplip message waiting, and provides a special URL for retrieving the mail. To pick up their messages, recipients can visit the Ziplip site, provided they're using a 128-bit secure browser such as Internet Explorer 5 or some versions of Navigator 4.7 and later. For added protection, Ziplip destroys messages 24 hours after they're read. Because someone else *could* intercept Ziplip's e-mail to your recipient, you can optionally use a password or phrase known only to you and the recipient.

Pretty Good Privacy For strong cryptography, turn to the



Key Master The PGP Recipients window is your keyring for the public keys of all your regular correspondents. As you obtain public keys, just drag them into the PGP Recipients window to add them to your keyring.

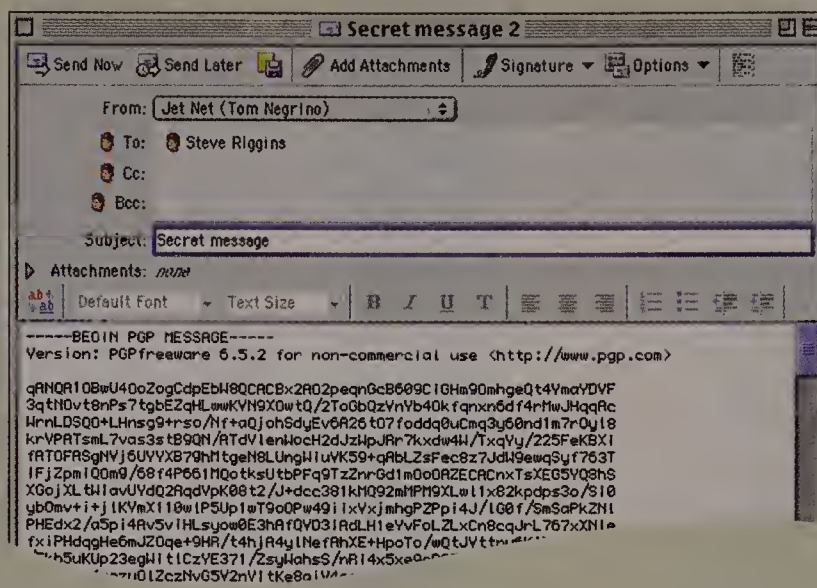
keyring, simply drag them into an open PGP Keys window. Now you are ready to send off your top-secret e-mail messages.

Encrypting Your E-mail The PGP package places a new PGP menu—denoted by a padlock icon—in your e-mail program (see the screen shot “PGP Tool Kit”). Open Outlook Express and compose your message. When you’re done, click in the message body and choose Select All from the File menu; then choose Encrypt from the PGP menu.

If you don’t already have the recipi-

ent’s public key on your keyring, the PGP Recipients dialog box appears (see the screen shot “Key Master”), prompting you to get the key over the Internet from the public key server. With the keys in place, PGP then encrypts the text and replaces the plain text with the ciphertext (see the screen shot “Secret Decoder”). Now click on Send Now.

Decrypting Messages To decrypt a message you’ve received, open it in Outlook Express. You must open the message in its



Secret Decoder This gibberish is actually the text of this article after encryption with a friend’s public key. It’s unreadable until the recipient unlocks it using his or her private key.

own window for PGP to work; Outlook Express can’t decrypt messages within its three-pane Preview mode. Select all text in the body of the message, then choose Decrypt/Verify from the PGP menu. PGP asks for your pass phrase, then decrypts and replaces the ciphertext in the message window with the plain text. If the sender signed the message digitally, Outlook Express adds a few lines at the top attesting to the signature’s status and who the signer is, as well as timestamps for signing and verification.

freeware PGP (Pretty Good Privacy). It uses 128-bit encryption as well as digital authentication, which tracks down the origin of a message, verifying the sender’s identity. PGP offers an advantage over other encrypting methods because it uses public key encryption, a process that doesn’t require agreeing on passwords in advance. (For an explanation of how PGP works, see the online sidebar “PGP Basics” at www.macworld.com/2000/07/features.)

You can download the software from MIT’s PGP distribution page (<http://web.mit.edu/network/pgp.html>). When you install PGP, a new menu appears in most Mac e-mail programs—including Outlook Express, Eudora Pro, and Claris EMailer—that allows you to encrypt and decrypt mail messages. (See the sidebar “Padlock Your E-mail with PGP” for tips on using PGP with Outlook Express 5.) The free download includes separate programs that help you encrypt files or folders on your hard disk, manage encryption keys (bits of code that encrypt and decrypt files), and securely erase files you’ve thrown in the Trash.

Learning Curve Ahead The positive aspect of using PGP is that you can be pretty confident that the information you send is secure and that only the intended recipient can read it. The files also remain encrypted on the recipient’s hard drive, preventing snoops from perusing them after transmittal.

However, you’ll encounter some significant obstacles in using PGP. The first is the setup required. You have to generate your code keys, which identify you, and upload one of them to a pub-

lic key server, where others can download your key and use it to send you messages. You also have to understand how the PGP system works before you can use it securely. It comes with a good manual, but the process is inherently complex and confusing—especially for cryptography newbies. And finally, encrypting and decrypting mail messages takes some extra steps. If you’re transmitting sensitive business information or trying to conceal a love affair, you’ll find the added effort worth the trouble. But for your average e-mail chatter, you probably shouldn’t bother.

By the way, it’s perfectly legal to use encryption software, although your employer may not want you to use it at work and can probably demand that you refrain.

The Last Word

As Bruce Schneier once said, “Security is a process, not a product.” There’s no quick and easy way to ensure that your e-mail messages stay strictly between you and your correspondents, but you can do a lot to protect yourself. Treat work e-mail as if your boss were going to shout your messages from the rooftops. Use alternative e-mail services or encryption when you need more privacy. And remember, sometimes it’s easier (and safer) to pick up the phone or use registered mail. Still, with a little forethought and willingness to change how you deal with e-mail, you can speak your mind—with peace of mind. **m**

Contributing Editor TOM NEGRINO’s latest book is *Quicken 2000 for Macintosh, Visual QuickStart Guide* (Peachpit Press, 1999).



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The Next Generation

Macworld Lab Evaluates **6** New Digital Displays

YOU MAY HAVE SEEN THEM IN SCI-FI TV SHOWS—slender flat-panel monitors with that oh-so-twenty-first-century look.

But you may not have realized that those LCDs (liquid crystal displays) connected to computers whose digital image signals still had to undergo a complicated conversion, to analog and then back to digital, in pretty much the same way as your old cathode-ray tube (CRT).

Welcome to the next generation.

In the same way that digitally recorded, digitally mixed music outputted onto a digital format sounds crisper than a digitized analog recording, digital LCDs

promise better performance than their analog counterparts because they keep your Mac's digital image signal *digital*.

Macworld Lab tested six digital LCDs to see if the digital promise holds true—the \$3,999 22-inch Apple Cinema Display, the \$1,299 15-inch Apple Studio Display 15.1 LCD, the \$1,199 15-inch HP Pavilion FX70, the \$1,299 15-inch NEC Technologies MultiSync LCD 1525X, the \$1,000 15-inch Philips Electronics Brilliance 150P, and the \$3,095 18-inch Princeton Graphics DPP800. A jury of experts looked at the monitors' sharpness, color fidelity, viewing angle (how far you can

move from directly in front of the screen and still see its contents clearly), and quality of DVD-video playback. (See the table, "Digital Divas: 6 Digital Flat Panels Show Off").

The Skinny

Although LCDs are more expensive than same-size CRTs, they do offer advantages beyond taking up less space on your desk (see "The World Is Flat," December 1998). Unlike the CRTs you're used to, LCDs have a backlight that is always on. Because of this, and because LCD pixels hold their color longer, you get much less flicker—and will likely experience less eyestrain. This makes LCDs ideal for viewing text, and they won't display weird effects such as moiré patterns in your images. Compared with CRTs, LCDs also use 90 percent less energy and run with less heat.

Through the Looking Glass But LCDs bring some trade-offs. They have a more limited viewing angle than CRTs—if you stand up and look down at your LCD, you're likely to see a dark, posterized version of your image.

Color accuracy also suffers with LCDs, making them inappropriate for graphics professionals who need consistent, reliable color. Although typical LCDs can display thousands of colors—plenty for most purposes—the monitors simply can't reproduce as many colors as a CRT. And as you look at an LCD from different angles, you'll notice subtle color shifts—and when viewed from more extreme angles, colors shift wildly.

LCDs are also subject to dead pixels, which show up as miscolored dots on your screen. Although none of the monitors we tested had this problem, it does occur; most manufacturers consider no more than about four acceptable.

Let's Get Digital When you look at a JPEG of your sister's new baby on your monitor, your computer is sending your monitor data about how to display that image. Analog and digital LCDs differ in the way they process that signal.

Analog LCDs take the digital signal from your computer,

convert it to an analog signal in your graphics card, and then convert it back to a digital signal in the monitor. There are several basic problems with this method. This conversion process is a tricky business; if the data is even slightly out of sync, your image may end up misaligned—blurry or marred by visual artifacts.

And since LCDs support only one resolution natively—they yield their best results when the number of pixels displayed is the same as the number of pixels physically present on the panel—an analog LCD has to translate any other frequencies and resolutions, increasing the chance for error.

Analog signals also carry more noise, which can muddy your images much like static on a telephone line distorts sound.

Digital LCDs are more direct—they simply pass along a computer's digital signal. This requires fewer components, which should also make digital LCDs cheaper to produce, although you won't see lower prices until demand increases.

Digital Video Card Required Although digital LCDs are technically simpler, they do require a special video card to support the digital interface. Some of the LCDs we tested, however—the NEC, HP, and Philips models—offered both digital and analog interfaces. You'll find this particularly useful if you plan to update to a digital video card and don't want to buy a new monitor when you make the switch.

The Great Debate Despite the benefits digital LCDs have over analog ones, some companies have been slow to make the switch. One reason is the continuing debate over digital interface standards—DVI (Digital Visual Interface) versus DFP (Digital Flat Panel), a subset of DVI technology. These different standards affect what kind of video card you'll need to run your monitor—none of the monitors we tested includes a digital video card.

With the addition of a DFP-to-DVI converter, the \$99 ATI Xclaim 3D Plus (905/882-2600, www.ati.com) supports all the 15-inch monitors we tested. For the Apple Cinema Display or Princeton Graphics DPP800, you'll need the ATI

Digital Divas: 6 Digital Flat Panels Show Off

Company	Product	Mouse Rating	List Price	Contact	Digital Interface	Warranty (in years)	USB Ports	Viewable Area*
Apple Computer	EDITORS' CHOICE Apple Cinema Display	★★★★	\$3,999	800/692-7753, www.apple.com	DVI	1	2	22
	Studio Display 15.1 LCD	★★★★½	\$1,299	800/692-7753, www.apple.com	DVI	1	2	15
Hewlett-Packard	EDITORS' CHOICE Pavilion FX70	★★★★	\$1,199	800/724-6631, www.hp.com	DFP (20-pin)	1	none	15
NEC Technologies	MultiSync LCD 1525X	★★★★½	\$1,299	800/284-4484, www.nectech.com	DVI**	3	4	15
Philips Electronics	Brilliance 150P	★★★★½	\$1,000	888/327-3636, www.philips.com	DVI	3	optional	15
Princeton Graphics	DPP800	★★★	\$3,095	800/747-6249, www.princetongraphics.com	DFP (26-pin)	3	4	18

* Measured diagonally in inches. ** Includes DVI-to-DFP adapter.



Pretty Picture HP's 15-inch Pavilion FX70.

Rage Pro 128 card with digital and analog outputs *and* a G4 with an AGP graphics slot. If your G4 didn't come with this card (all new G4s do), you can buy it for \$99 from the Apple Store (800/692-7753, www.apple.com). If your AGP graphics card has just one output, you've got analog only.

Other cards from Formac Electronic (925/251-0100, www.formac.com) and ProMax Systems (800/977-6629, www.promax.com) should be available to support these larger panels by the time you read this. (For an explanation of the different technologies, see the online sidebar "Facing the Interface" at www.macworld.com/2000/07/features/.)

The Proof Is in the Pixels

The LCDs we tested fell into two groups—15-inch and larger panels—and we picked an Editors' Choice in each category. We tested all the displays at maximum brightness and native

Native Resolution	Included Cable	Comments
1,600 × 1,024	digital	Great sharpness and brightness; cool design.
1,024 × 768	digital	Best viewing angle is off center; some image posterization.
1,024 × 768	analog	Superb DVD playback; saturated color; speakers; dual digital-analog interface.
1,024 × 768	digital	Image too dark at top and bottom of monitor; DVD playback not very vivid; dual digital-analog interface.
1,024 × 768	analog	Very good DVD playback; speakers; microphone; headphone jack; dual digital-analog interface.
1,280 × 1,024	digital	Image washed out and bluish.

resolution settings, using the \$1,499 21-inch CRT Apple Studio Display as a reference (see "Think Big," June 1999).

Gimme Control The first step in setting up and using a flat panel is adjusting color and brightness. Although it is possible to adjust both through the Monitors control panel in the Mac OS, you might find it more convenient to use the controls right on your monitor.

All the panels include controls for adjusting brightness. The HP adds several presets for color temperature (which changes the overall tone of your image), sharpening, and gamma—a type of contrast adjustment. The Philips has picture alignment controls, useful primarily for analog mode. The NEC offers the most precise control, including brightness and contrast adjustment, plus sliders to control levels of red, green, and blue.

Picture Perfect Adjustment controls aside, the most important aspect of any flat panel's performance is how well it displays images, and these monitors all performed admirably (for details, see the benchmark "Flat Panels Go Digital"). All the monitors offered excellent sharpness. In particular, the Apple Cinema Display's image was sharper than that of our reference CRT, the Apple Studio Display, at all resolutions—showing greater detail in one test image. And all the LCDs displayed much sharper and crisper text than our reference monitor.

Most of the panels also impressed us with their broad viewing angles—we could see the images clearly from a wide angle and only somewhat less clearly from vertical angles. The Princeton fell a bit behind the pack, with narrower viewing angles. Also, the NEC had image problems—even when we looked at it head on, it darkened the top and bottom areas of images.

True Colors The characteristic that most differentiated these models was their ability to reproduce color accurately and consistently at different angles. The Apple Cinema Display produced excellent color, although it tended to shift to a blue tone as we moved horizontally or vertically. The HP, NEC, and Philips models also impressed us with their accurate, saturated colors but had a similar color-shifting pattern.

The flat Apple Studio Display produced generally fine color, but we found that the best viewing angle came when we moved slightly off center horizontally. In some light areas of the image, we saw a posterizing effect from wider angles.

The Princeton fared worse in color fidelity. Its images seemed washed out compared with our reference CRT's, and it displayed an overall bluish tint even after we adjusted its color temperature.

Magic Movies If you plan to replace your CRT monitor with an LCD, you'll probably want the new display to perform all the same functions. This becomes a problem where DVD-



Staying Slim The HP Pavilion FX70 from the side.

Video is concerned. If you have the Rage 128 Pro for your G4, you can simply plug the monitor right in. But if you use the \$99 ATI Xclaim card—your only option if your Mac doesn't have an AGP graphics slot—you can't decode and watch DVD movies.

To determine video quality, we tested DVD playback using the G4's built-in Rage 128 Pro card and found acceptable performance on all the monitors. The HP, flat Apple Studio Display, and Philips offered exceptionally sharp images and good color range. The Apple Cinema Display seemed darker and less crisp than the others, perhaps because the smaller screens packed the images into a smaller space, making them appear sharper.

Creature Comforts Other features distinguished the monitors. The NEC and Princeton monitors both have four USB ports that turn your panel into a USB hub, and the NEC also has two upstream USB ports, allowing you to connect two computers to a single panel. The Apple models sport two USB ports each, and the Philips has a bay for an optional hub—only the HP has no USB potential. Also, the HP and Philips models both have built-in speakers, and the Philips even includes a microphone built into the panel itself.

Macworld's Buying Advice

Despite the advances in LCD technology and the innate superiority of digital LCDs, these monitors still aren't appropriate for demanding graphics professionals—their color shifts make it difficult to display images accurately.

But these monitors are certainly great if your primary concern is more desk space, lack of flicker, a second monitor—or simply great style. And if you're already considering an LCD, by all means go digital.

The HP Pavilion FX70 is our 15-inch-monitor pick. It displays saturated colors with excellent depth, and its images remain crisp even during DVD-Video playback.

The Apple Cinema Display is the clear winner of the two

larger-size panels we looked at. Even at almost \$4,000, its impressive image size, excellent color and sharpness, and gorgeous case make it a worthwhile choice. Remember, however, that when we went to print it only worked with G4s that had an AGP graphics slot.

The bottom line is that you may find a digital LCD a welcome addition to your computer system if you appreciate sharp text, need to conserve desk space, and don't need precise color—and if you've got a few thousand dollars burning a hole in your pocket. **m**

Assistant Editor FRITH BREITZER covers displays and imaging for *Macworld* and does not have a few thousand dollars burning a hole in her pocket.

EDITORS' CHOICE

BEST LARGE DIGITAL FLAT PANEL

★★★★ **Apple Cinema Display** Sharp and bright with excellent color and great design; requires graphics card compatible only with G4. **Company:** Apple Computer (800/692-7753, www.apple.com). **List price:** \$3,999.

BEST 15-INCH DIGITAL FLAT PANEL

★★★★ **Pavilion FX70** Saturated color; excellent DVD-Video playback; dual analog-digital interface. **Company:** Hewlett-Packard (800/724-6631, www.hp.com). **List price:** \$1,199.

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Flat Panels Go Digital

Although LCDs have always been much easier on the eyes than traditional CRT monitors, with sharper text and no flicker, the latest batch of flat panels has gone a step further—to digital. Our jury examined sharpness, color fidelity, viewing angle, and even playback of a DVD movie to determine whether keeping your computer's signal in the digital realm is really a boon to the LCD world.

SUBJECTIVE IMAGE QUALITY

	Sharpness	Color Fidelity	Viewing Angle	DVD-Video
★ Apple Cinema Display	Excellent	Excellent	Excellent	Fair
Apple Studio Display 15.1 LCD	Excellent	Excellent	Excellent	Excellent
NEC Technologies MultiSync LCD 1525X	Excellent	Excellent	Excellent	Fair
★ HP Pavilion FX70	Excellent	Excellent	Excellent	Excellent
Philips Electronics Brilliance 150P	Excellent	Excellent	Excellent	Excellent
Princeton Graphics DPP800	Excellent	Fair	Fair	Fair

★ = EDITORS' CHOICE

Behind Our Tests

Macworld Lab conducted subjective tests, ranking quality as excellent, fair, or poor. We tested displays at maximum brightness and native resolutions and rated each LCD panel according to how well it displayed our test images, derived from Adobe Photoshop and Microsoft Excel. We gauge

DVD video quality with a DVD movie played using Apple DVD Player and an Apple Power Mac G4/450 with a built-in ATI Rage 128 Pro graphics card.—Macworld Lab testing supervised by Jeffy K. Milstead



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ONE for the



The slim Palm Vx packs in lots of memory. Top right: Enjoy the Palm IIIxe with your morning coffee.

ROAD



PHOTOGRAPHY BY KEVIN CANDLAND

BY JEFF CARLSON

With the newest crop of **Palm OS** devices, you really **can**
take it with you. We tested 8 Mac-compatible handhelds
to help you make the **best choice** for your needs.

Ah, the days of the paper organizer. Shopping for a new one was as simple as going down to the corner stationery store. Should you spring for a leather-bound model? Do you want a calendar with Saturday and Sunday merged together or listed separately? Should the organizer fit in your briefcase?

These days, handheld organizers are running the paper organizer out of business—and for Mac users, *handheld* means organizers running the Palm OS and



Handspring Visor in the field.

manufactured by either Palm or Handspring. Shopping for these organizers has become more like shopping for a new computer, right down to comparing RAM size and fretting about future upgradability.

The truth is, shopping for a handheld organizer (sometimes known as a personal digital assistant, or PDA) shouldn't be too different from shopping for that low-tech pen-and-paper number. In the end, it all comes down to one thing: finding the

Hot Handhelds

Company	Product	Mouse Rating	List Price	Contact	Memory	2MB Flash ROM	Rechargeable Batteries	Screen
Handspring	EDITORS' CHOICE Handspring Visor	★★★★	\$179 (\$149 without cradle)	888/565-9393, www.handspring.com	2MB	○	○	High-contrast gray scale
	Handspring Visor Deluxe	★★★★	\$249	888/565-9393, www.handspring.com	8MB	○	○	High-contrast gray scale
Palm	Palm IIIc	★★★★½	\$449	800/881-7256, www.palm.com	8MB	●	●	Active-matrix color (256 colors)
	Palm IIIe	★★★★	\$149	800/881-7256, www.palm.com	2MB	○	○	High-contrast gray scale
	Palm IIIxe	★★★★	\$249	800/881-7256, www.palm.com	8MB	●	○	High-contrast gray scale
	Palm V	★★★★	\$329	800/881-7256, www.palm.com	2MB	●	●	High-contrast gray scale
	Palm VII	★★★★½	\$449	800/881-7256, www.palm.com	2MB	●	○	High-contrast gray scale
	EDITORS' CHOICE Palm Vx	★★★★	\$399	800/881-7256, www.palm.com	8MB	●	●	High-contrast gray scale

● = yes; ○ = no.

product that best fits the way you organize your life.

These days, you can choose from eight different devices running Palm OS—the \$449 Palm IIIc, the \$149 Palm IIIe, the \$249 Palm IIIxe, the \$329 Palm V, the \$399 Palm Vx, the \$449 Palm VII, the \$179 Handspring Visor, and the \$249 Handspring Visor Deluxe—and each one will appeal to a different type of person. *Macworld* looked at all of them, comparing price, specifications, and upgradability (see the table “Hot Handhelds” for details on each model).

The Least You Need to Know

Probably the best-known use of a handheld device is keeping track of your life. If you're looking for a basic personal organizer, any Palm device or Handspring Visor will help you remember your mother's birthday or how many reps to do at the gym.

Each model runs a version of Palm OS—core system software that includes built-in calendar, address-book, to-do-list, memo, and mail applications, as well as the ability to synchronize its information with included calendar and address-book programs for your Mac. An alarm feature will even alert you when you're about to miss that important lunch with your publicist and can double as a wake-

up call when you're on the road.

All the current devices also feature an infrared (IR) port for *beaming* records, such as business cards, and applications, such as your favorite games, to other IR-equipped Palm handhelds—you just point your organizer at another, and your data shoots through the air like magic.

Cheap and Basic For just the basic features, save money by buying the \$149 Palm IIIe or the \$179 standard Handspring Visor—both feature 2MB of memory, enough room to store thousands of phone numbers, addresses, and add-on software (for \$149, you can also get the Handspring Visor without a HotSync cradle). The \$329 Palm V offers the same specs at a higher cost but in a smaller, thinner case. If all you really want is an exceptionally cool address book and calendar, the extra \$200 is probably not worth it.

Special Needs If you don't require much from a handheld, your choice is easy—but if you have very specific needs, your choice may already be made.

If you want a color screen for eye-popping charts—or just for looks—the \$449 Palm IIIc (see *Reviews*, June 2000) is currently the only Palm OS device with a color screen.

Perhaps you need wireless Internet access to keep abreast of how many points

the NASDAQ is up (or down). You have more choices here, but still not many. The \$449 Palm VII is the only unit to offer *built-in* wireless Internet access, which means you avoid additional hardware expenses. But the required Palm.net service isn't available everywhere, so you should check Palm's coverage maps at www.palm.net/coverage/ to see if the service will meet your needs.

Other wireless Internet choices do exist, such as the \$369 Minstrel III Wireless IP Modem from Novatel Wireless (888/888-9231, www.novatelwireless.com) for the Palm III family, and the OmniSky Minstral V Wireless Modem (800/860-5767, www.omnisky.com) for the Palm V (the Minstral should be shipping by the time you read this).

Packing It In

If you need more than just the basics, it's time to start weighing a handheld's features. Your handheld device's memory will determine how many phone numbers, addresses, and programs you can store at any given time, as well as whether you can update the core operating system. The amount of built-in memory ranges from 2MB to 8MB. Since these devices don't have hard drives, they store most of the data in RAM, as digital cameras and MP3 players do, although some PDAs

Palm OS	Springboard Expansion	Pros	Cons
3.1h	●	Inexpensive; enhanced software; USB cradle.	OS is not upgradable.
3.1h	●	Inexpensive; enhanced software; USB cradle.	OS is not upgradable; no manual.
3.5	○	The only color model available.	Heavier than most Palms.
3.3	○	Affordable.	Mac software, serial and USB connections optional.
3.5	○	Competitively priced.	Cheap plastic stylus; lacks upgradability of IIIx.
3.3	○	Slender design.	Expensive; incompatible with many Palm III add-ons.
3.2	○	Wireless access.	Expensive service; bulky.
3.3	○	Slender design.	Expensive; incompatible with many Palm III add-ons.

also store data in semipermanent Flash ROM chips.

Miniature Applications None of the handheld devices we looked at comes with less than 2MB of RAM. Although this may sound puny, 2MB is enough to store 6,000 addresses and five years' worth of appointments. Even better news, Palm OS applications take up very little space compared with most Mac programs. The average application takes up a few dozen kilobytes, and the heftier ones take up just a couple hundred kilobytes.

By comparison, Microsoft Word 98 takes up 5.1MB—and that's just for the application, not including all the other files needed to run it. No doubt Palm OS apps will expand as handheld devices with more memory appear (remember, Mac OS used to fit on a 400K floppy disk, with room to spare for MacPaint).

Hefty Extras If you want to keep e-mail, electronic books, or big database files on your handheld, you might find yourself needing more RAM.

You can also fill up your RAM with software—remember, Palm OS organizers are essentially little computers, and you can install programs on them just as on your Mac. You can download and install thousands of utilities, games, system enhancements, and other programs (see "Programs to Pack" elsewhere in this

special report for a list of some of our favorites). If you need more RAM, consider the \$249 Palm IIIxe or \$399 Palm Vx, both of which offer 8MB of RAM.

If that's not going to be enough memory—say you also want to carry lots of games and reference materials—go with Handspring's \$249 Visor Deluxe. It comes with 8MB of RAM, too, and has the potential to add more memory using Handspring's Springboard memory modules (see the sidebar "On the Horizon").

Flashy Upgrades Just like Mac OS, Palm OS comes out in new versions from time to time—and the handheld model you buy may determine whether you can upgrade. Every Palm unit since the Palm III, with the exception of the Palm IIIe, features 2MB of flash memory for storing Palm OS and built-in applications. Normally this is read-only memory (ROM), but you can change its contents using a utility that overwrites the ROM.

Flash ROM is more expensive than standard ROM, which is why the Palm IIIe and both Visor models don't include Flash ROM. Those models are less expensive but can't upgrade Palm OS. So while the latest Palm handhelds are running Palm OS 3.5, Handspring's Visors are stuck at Palm OS 3.1h, the company's adapted version of Palm OS 3.1 (for more

information on Palm OS, see the online sidebar "In a Flash" at www.macworld.com/2000/07/features/).

Expanding Your Horizons

So what happens when you find you've outgrown your organizer's built-in capabilities and want to do more with it? You don't have to house everything related to your handheld inside its case—what about connecting external gadgets such as modems, pagers, and MP3 players?

A slew of external add-ons and accessories make the Palm more than just a digital Day-Timer, and all of them connect via the serial port located at the bottom rear of the Palm organizers. You can purchase modems, global positioning systems, digital cameras, data-acquisition tools, and a multitude of other gadgets to get the most out of your Palm (see the online story "Palm Accessory Roundup" at www.macworld.com/2000/07/features/). Remember, however, that the Palm V series does not have the same serial connection as the Palm III series and the Palm VII, so add-ons are not universally compatible.

Snappy Goods The arrival of Handspring has complicated the Palm peripheral market by creating a new method of connecting hardware to the device: Located on the back of every Visor, the Springboard slot accepts modules designed for Handspring handhelds, making the Visor potentially the best choice in terms of hardware expandability.

Several companies are currently creating modules such as MP3 players, cameras, and wireless communication tools (see the sidebar "On the Horizon") that require no installation or setup: plugging one in loads the associated software. The Springboard memory module, for example (one of the few modules actually available as of this writing), lets you add more RAM without digging into the guts of the organizer, and opens up the possibility of storing applications and data on multiple modules according to category—you could pop in work databases during the day and then replace your games and personal information in the evening.

Communicating with Your Mac

When it comes time to enter information for all your friends and contacts or perform any other data-entry task, the last thing you want to do is spend hours pecking away on a small screen with a stylus—

HOW CAN
PALM
MOBILIZE
YOUR
BUSINESS?



Database Manager	ATM Locator	Cigar Guide	Vehicle Maintenance Log
Intranet Access	Contact Management	Internet Access	Language Translator
Custom Form Creation	Online Shopping	City Guide	Drawing
Expense Reports	Thesaurus	Customer Relationship Mgt.	Foreign Alphabets
GPS	Black Jack	Address Book	Diet Log
Infrared Beaming	Area Codes	Snow & Ski Reports	Biorhythms Chart
View Word & Excel	Golf Scoring	Door-to-Door Directions	Color Image Viewer
Sales Force Automation	Dictionary	Security	Wine Guide
Flight Schedules	World Almanac	Workout Log	E-mail
Shareware	Periodic Table	Pilot Training	Time Management
Inventory Management	Weather Report	Receipt Printing	TV Remote
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Link to Outlook	Alarm Clock	Package Tracking	Link to Oracle
Paging	World Map	Sports Report	<div> <p>Want to know even more?</p> <p>Visit us at www.palm.com</p> </div>
Syncing with a Mac	Spell Check	Link to Sybase	
Server Synchronization	Link to SAP	Amortization Tables	
Traffic News	Help Desk Automation	Online Auctions	<div> <p>Simply Palm™</p> <p>www.palm.com</p> </div>
Bar Code Scanning	Wireless Access	Medication Management	
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Groupware	Restaurant Guide	Chess	



The Palm IIIc displays your life in living color.

and that's where interaction with your Mac is critical. Palm dubs its handhelds "connected organizers," but how well does the connection between your Mac and the Palm and Handspring devices hold up? Both companies offer Macintosh compatibility and the ability to synchronize, or *HotSync*, information at the touch of a button, but they stumble in different areas of the implementation.

Auto Pilot Palm's Mac support is thorough in some areas and surprisingly spotty in others. The latest version of the desktop software, Macintosh Palm Desktop 2.5, still adds calendar and address functions to your desktop, but it now offers more control over synchronization with multiple Palm devices and provides USB support—important these days, since new Macs don't have serial ports. Also, Palm handhelds running Palm OS 3.3 or 3.5 have the built-in ability to perform HotSync operations via infrared to IR-equipped PowerBooks.

However, none of the Palm devices include Mac software, so you must either pay for it on CD-ROM or download it from Palm's Web site. Either way, you'll

still need to buy Palm's \$40 USB Connection Kit or \$6 Macintosh Serial Adapter, depending on your Mac's connectors, in order to attach the PC-style serial cable snaking out from the HotSync cradle.

Spring into Action Handspring's Macintosh support is better but has its own quirks. The installation CD that comes with every Visor includes the Macintosh software but currently supports only Macintosh Palm Desktop 2.1. (Handspring plans to release a 2.5 version that works with the Visors later this year.) Handspring has also embraced USB in a big way—every \$179 Visor comes with a USB HotSync cradle. This is great if you have a new Mac, but it means that owners of older Macs must pay \$30 extra for a serial cradle. Unfortun-

nately, the Visor doesn't include built-in support for IR HotSync operations, although Handspring says third-party software can provide this capability.

Macworld's Buying Advice

If you're looking for an everyday handheld and don't need the flash of more-expensive models, the Handspring Visor is the clear winner. Unless the smaller size of a Palm V is important to you (and honestly, except for the Palm VII they're all small enough to put in a shirt pocket), you'll get the best bang for the least buck with a standard Visor. Its 2MB of memory is plenty for using the built-in applications and others you want to install. You can take advantage of software improvements like the enhanced Date Book and Calculator. Plus you get the advantage of the Springboard slot, enabling you to upgrade in the future for only the cost of memory modules or other add-on Springboard cartridges.

The best choice for those who need to carry around lots of files is the Palm Vx. Although other devices feature 8MB of memory (or the possibility for more than 8MB, as with the Visor), the Palm Vx's smaller, thinner design is really the deciding vote. Also key is its ability to upgrade to new versions of Palm OS and interact with Macintosh Palm Desktop 2.5.

Although switching from pen and paper to screen and stylus might seem like a leap of faith, it's easy to safely find the right handheld to fit your needs. **m**

JEFF CARLSON is author of *Palm Organizers Visual QuickStart Guide* (Peachpit Press, 2000).

EDITORS' CHOICE

Best Everyday Handheld

★★★★ Handspring Visor With all the basic applications of every Palm OS handheld, the inexpensive Visor offers software improvements, the Springboard expansion slot, and an included USB connection. **Company:** Handspring (888/565-9393, www.handspring.com). **List price:** \$179.

Best Professional Handheld

★★★★ Palm Vx Packs the best aspects of a professional Palm device—8MB of memory, flash ROM, a high-contrast screen—into a small, thin, stylish package. **Company:** Palm (800/881-7256, www.palm.com). **List price:** \$399.

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PROGRAMS to

Macworld's editors pick 15 software titles

that help you get the most out of your handheld.

A handheld is only as useful as the software it runs—otherwise, it's just an expensive paperweight. Since its introduction four years ago, Palm OS has amassed a rich following of developers, from amateur programmers to professional software publishers, who have created tens of thousands of programs for use on Palm and Handspring handheld organizers.

A peek at Web sites like PalmGear (www.palmgear.com) or the Tucows PDA site (<http://pda.tucows.com/palm/>) reveals tons of freeware and shareware, ranging from multifunction clocks to strategy games. Instead of trying to pick the best programs—a daunting task that would surely mean missing out on a lot of worthy software—we asked *Macworld's* Palm-using editors to choose some of their favorite apps for everything from productivity and organization to travel and games.

Keep Connected

AvantGo, AvantGo, <http://avantgo.com>; free

Want to carry Web pages with you on your Palm? There's no easier way than the free AvantGo, which connects to the Web sites you've chosen to read and updates your Palm with their contents every time you HotSync. Even graphics and hyperlinks transfer over, making AvantGo a great way to read your favorite publications when you're on the go.

MultiMail Pro, Actual Software, www.actualsoft.com; \$40

If you've got a modem on your Palm, you can check multiple POP or IMAP e-mail accounts from the road with MultiMail Pro. It offers message filtering, multiple mailboxes, and other features we've come to expect from Mac e-mail programs. The MultiMail Conduit (\$30; \$20 with purchase of MultiMail Pro) can HotSync either MultiMail or the built-in Palm mail application with your Outlook Express, Claris EMailer, or Eudora mailboxes.

Get Organized

Actioneer 2.0 for Palm Handhelds, Actioneer, www.actioneer.com; \$20

Billed as "the easiest way to get information into your Palm organizer," Actioneer provides a notepadlike way to enter information on your handheld and then lets you include the note in any of the four native Palm utilities.

BrainForest Mobile Edition 2.1, Aportis Technologies, www.aportis.com; \$30

Those of us who relish the organizing capacities of an outline will certainly appreciate BrainForest, which gives you the ability to group action items (notes or to-dos) under common headings of your own choosing and then export those items to the Palm's native to-do list or notepad.

JFile Pro 1.0d, Land-J Technologies, www.land-j.com; \$25

FileMaker Pro won't run on your Palm, but this impressive database program will. Add FMSync Software's FMSync for JFile Pro (\$38, www.fmsync.com), and you can even HotSync JFile to your FileMaker databases.

Launch 'Em 2, Synergy Solutions, www.synsolutions.com; \$10

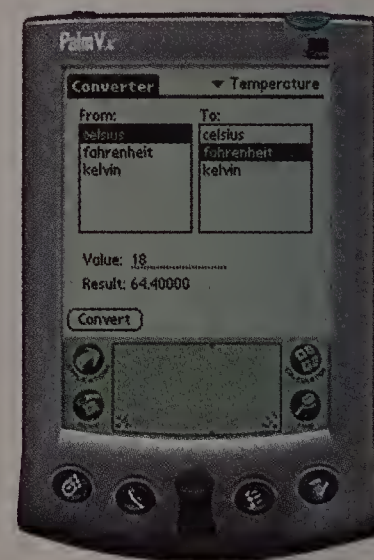
Want to give your Palm a more Mac-like feel? This cheap utility is the answer. It replaces your Applications program with a multi-tabbed, drag-and-drop interface—complete with Trash Can!

TealLock 2.10E, TealPoint Software, www.tealpoint.com; \$12

Don't leave your personal information unprotected. TealLock is a clever security program for your PDA that picks up where



Tetris Who? SameGame will have you dreaming about blocks—over and over again.



Quick Change Converter lets you switch between measurements with a tap of your stylus.

PACK



The Palm VII keeps you connected.

Palm OS's Security program leaves off. It offers not only password protection but also password masking, and it allows you to add conditions (timed, by keystroke, power off) to Show/Hide Private Records and Turn Off & Lock.

Workout Tracker 2.19, Stand Alone, www.standalone.com/applications/palm/workout_tracker/index.html; \$20

Designed to co-opt your PDA as a mobile workout log, this application encourages weight-lifting aficionados and aerobics enthusiasts to log activity specifics and then analyzes the saved information.

Travel Smart

Currency 3.0c, Henrique M. Martins,

http://members.xoom.com/HM_Martins/currex.htm; free

Need to know the exchange rate for the Albanian lek, Costa Rican colon, Laotian kip, Surinamese guilder, or Zambian kwacha? This foreign-currency converter and calculator includes 165 currencies for everywhere from Afghanistan to Zimbabwe, and you can download updated exchange rates daily. You can even define up to ten additional currencies—perfect for when you create your island kingdom and start printing your own money.

Have Fun

Converter 1.1, Matt N. Marsh, [www.matt.oaktree.co.uk](http://www.matt.oaktree.co.uk/computing/converter.shtml)

/computing/converter.shtml; free

If you have trouble remembering just how many pounds are in a stone or fluid ounces are in a liter, or how to convert 30 degrees Celsius to Fahrenheit, you need Converter. This program converts

most standard units of length, volume, area, weight, speed, and temperature. And even better, the program does all the calculations for you rather than just giving you the conversion factors.

EightBall 1.2, Jaler Group, www.wagner.net/babel.html; free

This one's just the trick for anyone who has a hard time making decisions or needs a little advice. Wondering whether you'll meet that important deadline? Ask the all-knowing EightBall, and then shake, roll, or spin the ball. Tap it to see your answer: "Outlook not good." Yes . . . it is very wise.

Planetarium 1.9, Andreas Hofer, www.aho.ch/pilotplanets; \$19

What star is that? When will the Moon rise? Where is Jupiter right now? Planetarium knows these answers—and a whole lot more. The positions of the Sun, Moon, planets, and 1,600 of the brightest stars, nebulae, and other celestial bodies are loaded into the 99K Planetarium. Scan the heavens in compass view or sky view. It's a little tricky but well worth the effort.

Pipeline Perils, Neil Pollard,

www.antigone.demon.co.uk/pilot/pipeline/; \$10

In the classic Mac game Pipe Dream, you had to connect sections of pipe in various shapes quickly while keeping ahead of the advancing flow of water. Neil Pollard's homage is an action puzzle game worth playing.

SameGame 1.0, DejaVu Software, www.dejavusoftware.com

/same/index.html; \$10

Like Tetris in reverse, this game starts with a screenful of patterned squares, which you must eliminate. When you tap a square, every adjoining square of the same pattern also disappears, and the remaining blocks slide down to fill the empty space. The more complicated the pattern of blocks you remove, the higher your score—and the more addictive the game becomes.

TealInfo 2.22D, TealPoint Software, www.tealpoint.com; \$17

TealInfo is a handy application that allows you to view databases of everything from mixed-drink recipes to guitar chords to metric conversions. Posted on TealPoint's Web site, these handy little files can find out what names mean, how much of a tip to leave, how to put on a tie—you can even set up your very own Pokémon card checklist.



Moondance Planetarium promises the moon and the stars—and it delivers.



Blast Off! Make your Palm's applications menu feel more like your Mac's with Launch 'Em 2.

Macworld Assistant Editor FRITH BREITZER, MacBuy.com Senior Editor SUZANNE COURTEAU, Macworld Assistant Editor KELLY LUNSFORD, Macworld.com Senior Editor LISA SCHMEISER, and Macworld.com Editor JASON SNELL contributed to this article.

On the HORIZON

WHEN YOU'RE READY TO TAKE YOUR HANDHELD TO THE NEXT LEVEL, BOTH PALM and Handspring models offer you the ability to attach extras that expand your device's capabilities. For ratings of some of these Palm additions, you can visit www.macworld.com, but we're going to give you a peek at one of the most exciting features of Handspring's Visor line—the expansion slot known as the Springboard. However, most of the Springboard add-on modules were still in the design stage as of press time.

Currently shipping products include Tiger Woods PGA Tour Golf, the 8MB Flash Module, the Quick Backup Module, and the Modem Module. Here's a look into the not-so-distant future.



Tune in with the Visor.

Book modules, Peanut Press, 781/937-3489, www.peanutpress.com; Mesa View, 800/951-2620, www.mesaview.co; prices vary

Both of these companies plan to offer book modules. Peanut Press plans to introduce a Star Trek series as well as a business series called The Agile Manager. Mesa View initially plans to release classic literature from authors such as Shakespeare and Jack London. Soon after, Mesa View will create original content from its own list of writers.

Cue VisorRadio, Cue, 949/862-8800, www.cue.net; price not announced

You'll soon be able to listen to your favorite radio station, adjust your schedule, and even respond to a page—all with one device. Cue's VisorRadio will feature an FM tuner so you can listen to the radio, plus it will receive traffic reports (\$60), weather forecasts, news alerts, and personal messaging. For features beyond the FM tuner, you'll pay a monthly fee, depending on what services you want. You'll customize traffic reports by route using maps from Cue's Web site, and the weather reports for 500 cities will come in on an hourly basis. If you travel to the same places regularly, you'll appreciate the ability to categorize FM tuner presets by city and station name.

InfoMitt, Innogear, 408/848-8338, www.innogear.com; \$50
Innogear's InfoMitt brings prepaid paging service to your handheld with 1,000 units or three months of nationwide service. The service includes a personal toll-free number and digital- or alphanumeric-message capability, plus a variety of other perks. The software package can also update your calendar and address book when you send certain tagged information in text pages.

MiniJam, Innogear, 408/848-8338, www.innogear.com; price not announced

The MiniJam is a portable MP3 player with controls right on the module. You just drag and drop to transfer files to the device, and the company plans on making the modules available with 0MB, 8MB, 16MB, or 32MB of internal memory. The MiniJam also has an on-board memory-card expansion slot for MMC (MultiMedia-Card) cards, currently available in 32MB capacity (64MB cards should arrive soon). The module sports a standard audio jack: use it with the provided headphones, or plug it into a small multimedia speaker system. The MiniJukeBox software offers playlist information; equalizer settings; ID3 information; and volume, balance, and

play controls. The Handspring batteries power the module, or you can attach a variety of auxiliary external power supplies for the home and car.

Merriam Webster Dictionary, Landware, 201/261-7944, www.landware.com; price not announced

Bad spellers of the world, untie! The Merriam Webster Dictionary module from Landware will have you spelling correctly in no time. It provides easy access to more than 60,000 words and their definitions from almost any application on your Visor.

MyCorder Data Acquisition System, Datastick Systems, 408/615-5774, www.datastick.com; price not announced

Perhaps one of the most scientific attachments for the Handspring is the MyCorder Data Acquisition System. Supporting six analog sensors, the MyCorder lets you measure and record environmental information such as deep-water temperature for oceanographic research and the pressure and density of snow pack. You can easily enter the measurements into a database and later export them into spreadsheets using HotSync.

Quo Vadis HandyGPS, MarcoSoft, 650/326-4727, www.marcosoft.com; \$180

Suddenly the need to stop and ask for directions becomes truly obsolete with MarcoSoft's Quo Vadis HandyGPS. HandyGPS offers worry-free travel with the ability to pinpoint your exact coordinates, including your speed and heading. You can also download maps from MarcoSoft's Web site that show street names, street symbols (one way and so forth), and landmark icons. You can even have the GPS software scroll the map as you move, or scroll it using your stylus.

Sixpak Combo, Innogear, 408/848-8338, www.innogear.com; under \$200

Innogear's Sixpak Combo packs a 56-Kbps modem, cellular-capable modem, voice recorder with speaker, vibrating alarm, flashing LED alarm, and memory expansion slot into one module. It requires no extra batteries and allows you to send faxes and e-mail, surf the Internet, and record voice messages—all on your Visor. The vibration alert function adds vibration to the list of options in your calendar alarm settings, for those times—at the opera, for example—when beeps and bells just aren't appropriate.—BRETT LARSON

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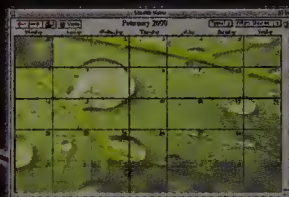
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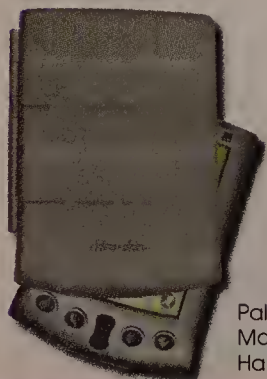
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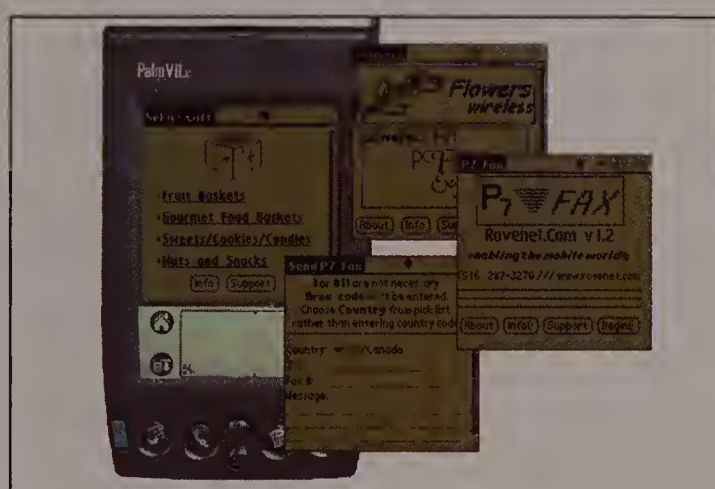
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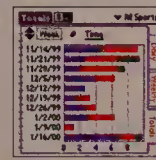
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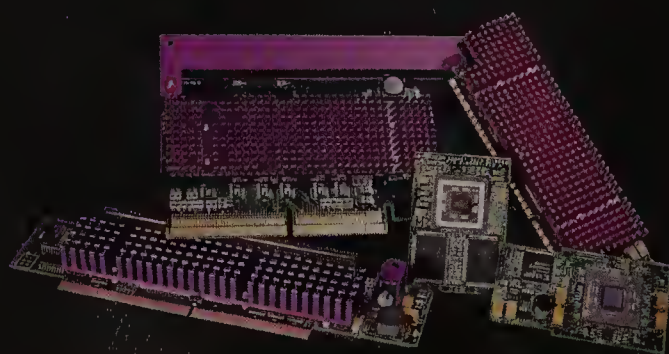
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Secrets

Automate Your Folders

DON'T LET YOUR FOLDERS JUST SIT THERE—PUT THEM TO WORK

by Joseph Schorr

How many times a day do you open and close folders, drag files in and out of folder windows, or move and resize the windows on your desktop? Consider this: every time you perform one of those mundane tasks, you could be tapping into the timesaving power of folder actions—a feature introduced with Mac OS 8.5.

Folder actions let you attach specific AppleScripts to your folders, training them to perform tasks whenever they're opened, closed, moved, and so on. Imagine creating folders smart enough to open just where you want them or to clean up after themselves, closing their own subfolders. While hard-core AppleScript pros can have a field day with the stuff, you don't need to have a programming language under your belt to pull this stunt off.

The first trick is to find the Mac's folder-action features—you won't find a single menu command in the Finder, and there's nothing in Apple's Script Editor that indicates you can attach a script to a folder. Even the ten sample scripts Apple provides to get you started are tucked away inside a folder buried two levels deep within the System Folder. We'll show you a couple of additional tricks involved in bringing folder actions to life, along with a sampling of the cool things you can make your Mac do. For most of the commands we describe, you can use Script Editor's built-in Record feature to create scripts by simply



recording your actions in the Finder (see *Secrets*, November 1999).

Hooking Them Up

To create a folder action, control-click on any folder (or disk icon) to which you want to attach an action. At the very bottom of the contextual menu that pops up, you'll see a command called Attach A Folder Action. Choose this command, then select the AppleScript you want to use. Once you've selected a script, a contextual pop-up menu provides commands for editing and removing folder actions (see "Finding Folder Actions"). A tiny AppleScript badge appears on the lower left corner of a fold-

er's icon once you've attached a script to it.

Not every AppleScript is eligible for use as a folder action, though. Folder actions work only with scripts saved out of Script Editor as compiled scripts, not with those saved as applications. If you've saved a script as an application, open it in Script Editor and resave it in the compiled-script format by selecting that option from the Kind pop-up menu in the Save As dialog box.

Furthermore, saving an AppleScript as a compiled script with the Attach A Folder Action command won't work if your script doesn't start and end with

continues

certain action-specific commands (see "Magic Words"). The required scripting isn't terribly complicated, but these little snippets of code are essential for your folder actions to work. The examples that follow demonstrate the words you need to have in place.

Finally, folder actions get triggered only when the folders to which you've attached them are open. In other words, you can't trigger a folder action by dropping a file into a *closed* folder.

Lockable Window Locations

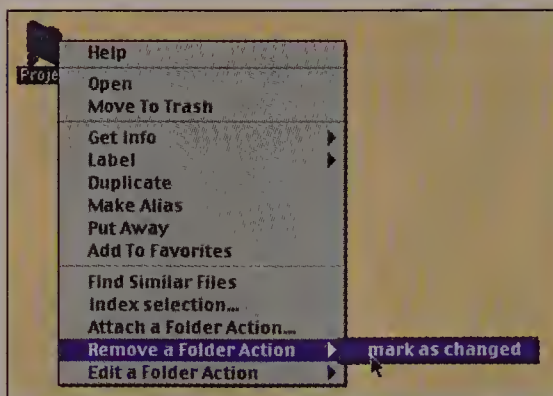
If you don't like it when other users mess with your carefully organized on-screen workspace, here's a cool trick: create a folder window that always springs back into place—at the exact size and position you prefer—whenever anyone attempts to move it.

First, record an AppleScript that specifies the position and size of the window you want to control. Open that window; launch Script Editor; click on the Record button; and while recording, position and size the window. When you're done, click on the Stop button. The script that results will look something like this:

```
tell application "Finder"
    activate
    set position of container window of folder ~
        "Your Folder" of startup disk to {405,
        105}
    set size of container window of folder ~
        "Your Folder" of startup disk to {409,
        279}
end tell
```

Now, to turn it into a folder action, add the following lines to the beginning and end of the script. It will look like this:

```
on moving folder window for this_folder
from original_bounds
    tell application "Finder"
        activate
        set position of container window of
        folder ~
            "Your Folder" of startup disk to
            {405, 105}
        set size of container window of folder ~
            "Your Folder" of startup disk to
            {409, 279}
    end tell
end moving folder window for
```



Finding Folder Actions Control-clicking on a folder reveals all the commands needed to attach, remove, and edit folder-action scripts. Notice the folder icon's small AppleScript badge, which indicates that the folder has a script attached to it.

The first and last lines of code perform the enclosed tasks any time someone tries to move or resize the window. Save this code as a compiled script, and then attach it to a folder using the steps outlined previously. From now on, that folder's window will instantly jump back into the position you've set whenever anyone tries to move it.

Smarter Windows

Similarly, you can create smart folders that always pop open exactly as you specify. Suppose you want a project folder that always opens at the left side of your screen, with items sorted by date. Again, you'll first record a script in Script Editor: click on Record, open the window, put it where you want it, and set the list view according to your preferences. The script will record all your actions. When you're finished, click on Stop.

To transform this script into a folder

action, you'll add two lines to the recorded script, one at the top and one at the bottom:

```
on opening folder this_folder
    tell application "Finder"
        activate
        set size of container window ~
            of folder "Projects" of startup disk to
            {293, 275}
        set position of container window ~
            of folder "Projects" of startup disk to
            {12, 478}
    end tell
end opening folder
```

The two **opening folder** commands tell your Mac to run this script whenever a user opens the folder to which it's attached. This guarantees that the folder will always open in the same spot, with the same settings.

If you want to dig deeper into folder actions, check out the sample scripts that Apple keeps nestled away in the Scripts folder inside your System Folder. (There's no special reason to store these scripts in the System Folder, by the way. You can place saved folder-action scripts in any convenient location on your system.) Though you may not find the samples that compelling, they provide a good model for developing more-sophisticated folder actions. **m**

JOSEPH SCHORR, a *Macworld* writer since 1991, enjoys tinkering with AppleScript, though he is the first to admit that, at heart, he's a severely code-writing-impaired journalist.

Magic Words

FOLDER-ACTION SCRIPTS MUST START and end with commands specifying the particular action that triggers them. Here are the five different commands for making

folder-action-savvy scripts. As is always the case with scripting, exact wording and syntax counts when you're including these commands in your scripts.

To Create Folder Actions Triggerged by:	Start Your Script with This Command:	End Your Script with This Command:
Opening a folder	on opening folder this_folder	end opening_folder
Closing a folder	on closing folder window for this_folder	end closing folder window for
Adding items to a folder	on adding folder items to this_folder	end adding folder items to
Removing items from a folder	on removing folder items from this_folder	end removing folder items from
Moving or resizing an open folder window	on moving folder window for this_folder from original_bounds	end moving folder window for

Tips, Tricks, and Shortcuts

by Lon Poole

No password is unbreakable, but alphanumeric passwords are more secure than the passwords many people use, which tend to be composed of letters only. Jim Butler of San Diego compiled three different methods for creating easy-to-remember alphanumeric passwords. With what he calls the look-alike method, you use numbers in place of the letters they resemble, replacing the letter *o* with the number 0, *i* with 1, *z* with 2, *s* with 5, *G* with 6, and *g* with 9. For example, *worlds* becomes *w0r1d5*.

With the license-plate method, you create passwords from phrases by substituting individual letters and numbers for words and syllables they sound like. For instance, "I see you ate before two" becomes *icu8b42*.

The 0-to-J method is more complicated and harder to remember at first. You substitute the numbers 0 to 9 for the letters *a* to *j*. Simply pick a word and replace any occurrence of *a* with 1, *b* with 2, *c* with 3, and so forth. For example, *benzene* becomes *25nz5n5*.

Another method is to create passwords that are acronyms for mnemonic phrases—for example, *B282fbsl*, which means "Bad-water [is] 282 feet below sea level."

also true of the Modem, AppleTalk, TCP/IP, and File Sharing control panels.) But there are ways to give Normal users the same control you get from the Remote Access control panel. How you go about it depends on what type of control users need.

If all a user needs to do is connect and disconnect manually to the Internet, give access to the Control Strip so the user can open the Remote Access module. (The Owner can make the

work configurations via the Location Manager, but it's not convenient (it requires restarting). Here's how to grant access *and* avoid trouble: the Owner must create a location in the Location Manager control panel for each network configuration a user may need. Additionally, the Owner must use the Location Manager's Preferences command (in the Edit menu) to set the Startup Switching option to Always. Thereafter, the Location Manager will ask the user to select one of the preconfigured locations during start-up. Since this opportunity occurs only during the start-up process (before log-on), users must restart the computer to change the network configuration; the Logout command is not sufficient.

Warning: Make sure to tell users they must restart in order to change network settings. The OS won't let anyone but the Owner change settings via Location Manager without restarting. Even worse, attempting to change settings could cause Location Manager to malfunction. For instructions on how to guard against such mishaps, read

article 60657 in the Apple Tech Info Library (<http://til.info.apple.com/techinfo.nsf/artnum/n60657>).

Window-Hiding Shortcut

Q. Do you know of a one-step method for getting a clean view of my desktop when I have several applications open? This normally requires two steps if I'm already working in an application. First, I switch to the Finder from *continues*



Get Around Remote-Access Limits

Q. Can I configure the Multiple User control panel so that a Normal user can open the Remote Access control panel?

ALEX FLAX
Long Island, New York

A. The network configuration is usually the same for all a specific computer's users, so Mac OS 9 allows only the Owner to make changes in the Remote Access control panel. (This is

Control Strip available to Limited and Panels users as well.)

Another option is to make connecting and disconnecting automatic no matter who's using the computer. To do so, configure the Remote Access control panel to connect whenever a user attempts to dial in (for instance, to retrieve e-mail messages or browse the Internet) and then disconnect after a designated period of inactivity.

What if users need to do more than connect and disconnect? You can let any user change Remote Access or other net-

the active application. Second, I choose the Hide All option from the application menu.

JEFF O'SHEA
San Diego, California

A The first shortcut is to develop a new habit: hide applications whenever you leave them. That way, when you switch to the Finder, all applications are already hidden. For this tactic to pan out, you must diligently press the option key every time you switch applications. The option key works with multiple switching methods—choosing an application from the Applications menu, clicking in another application's window, or clicking in the Application Switcher palette of Mac OS 8.5 and later.

Don't want to be that obsessive? As an alternative, use the AppleScript applet shown in "Switch and Hide."

Destination: Desktop Folder

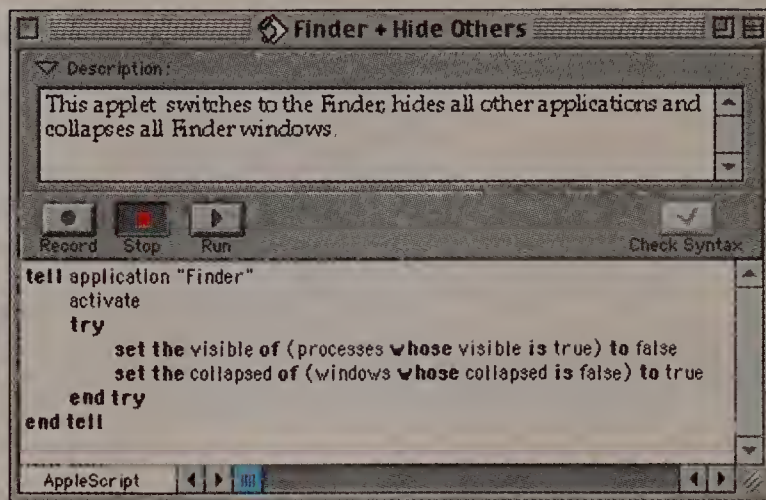
TIP I like to set the Desktop Folder as the destination for Web downloads and e-mail attachments. This is no problem in programs that use the old-fashioned Open dialog box, where you simply click the Desktop button and then click any grayed-out item, such as the Trash. But this trick doesn't work in programs that use a Navigation Services dialog box with Mac OS 8.5 and later.

You can select the Desktop folder in this dialog box by pressing the option key while choosing Desktop from the Shortcuts menu. Alternatively, you can choose Desktop from the Shortcuts menu (or press ⌘-D). That brings up a list of desktop items with one of the items selected. Next, shift-click the selected item to deselect it, and then click the Select button.

DYLAN DRAZEN
Brooklyn, New York

Moving Paragraphs with Keystrokes

TIP In AppleWorks (aka ClarisWorks 5), you can use keystrokes to move paragraphs in a document. Just put the insertion point in the paragraph you want to move, or select the text in mul-



Switch and Hide This simple AppleScript applet switches to the Finder, hides all other applications, and then collapses all Finder windows, giving you an unobstructed view of the desktop. Enter these commands in a Script Editor window. When you save them, set the Format option to Classic Applet and turn on the Never Show Startup Screen option. To make switching and hiding a one-step process, put the saved applet in the Apple menu. If you don't want the applet to collapse all Finder windows, omit the statement that begins "set the collapsed."

multiple paragraphs if you want to move more than one. Then press control-up arrow or control-down arrow to move the paragraph(s) up or down one paragraph.

You can also increase or decrease a paragraph's left indent half an inch by pressing control-right arrow or control-left arrow.

BEN ROSENTHAL
Ithaca, New York

Orderly MP3 Playlist

TIP After ripping a CD to MP3 files, you may wish to add these files to a playlist in their order of appearance on the CD. Assuming that your encoder processes them sequentially (most do), simply view the folder containing the MP3 files as a list, sorted by Date Modified or Date Created with the oldest file at the top. Then select all the files and drag them en masse to the playlist, where they'll show up in the correct order.

NICHOLAS RAGAZ
Peterborough, Ontario, Canada

InDesign Autorecover Trouble

TIP Adobe InDesign's autorecover feature can be a lifesaver, unless it's trying to recover a rather large document. If a crash happens when you're working on a massive document, future

attempts to start InDesign may result in a crash because of lack of memory. To work around this, open the InDesign folder and look for the InDesign Recovery folder. Open it and throw away all contents. Next, open InDesign by double-clicking the application icon (not by opening a document). Now you can choose Open from InDesign's File menu, select the document you want to open, select the Open Copy option at the bottom of the dialog box, and click Open. A copy of the selected document opens, in the same condition as when you last saved it (and not when InDesign last autosaved it).

JUSTIN MAYO
Harper, Kansas

Sherlock 2 Searches Specific Folders

TIP Sherlock 2, unlike its predecessor, appears to offer no method for limiting a search to a specific folder. In fact, there is a way to do it. Just drag folders you want to search to the list of searchable items in Sherlock 2's Files channel, and Sherlock will add them to the list. For instance, you can toss your Documents folder, Applications folder, or whatever folders you want onto the list of searchable items, deselect other items on the list, and watch Sherlock 2 ignore the dross.

SHAWN KING
Burnaby, British Columbia, Canada

LON POOLE answers readers' questions and selects reader-submitted tips for this monthly column. He is a coauthor, with Todd Stauffer, of *Macworld Mac OS 9 Bible* (IDG Books Worldwide, 2000).

All shareware and freeware mentioned in *Quick Tips* is available from the Macworld Online software library (www.macdownload.com).

We pay \$25 to \$100 for tips selected for publication that discuss how to use Macs, peripherals, or software. Please include your full name and address, so that we can send you your payment. Send questions or tips to quicktips@macworld.com or to Macworld Quick Tips, 301 Howard St., 16th Fl., San Francisco, CA 94105. All published submissions become the sole property of *Macworld*. Due to the high volume of mail received, we cannot provide personal responses. **m**

Keep Quark in Style

IMPORT MICROSOFT WORD STYLE SHEETS INTO QUARKXPRESS

by David Blatner

Long before Microsoft Word dominated the word processing field, a program called MacWrite was bundled with every Mac sold. The original version of MacWrite was based on word processing technology licensed from Quark—surprising, given that importing text into QuarkXPress is far from trouble free. If Quark was processing words back in the 1980s, why doesn't XPress do a better job of importing word processing files today?

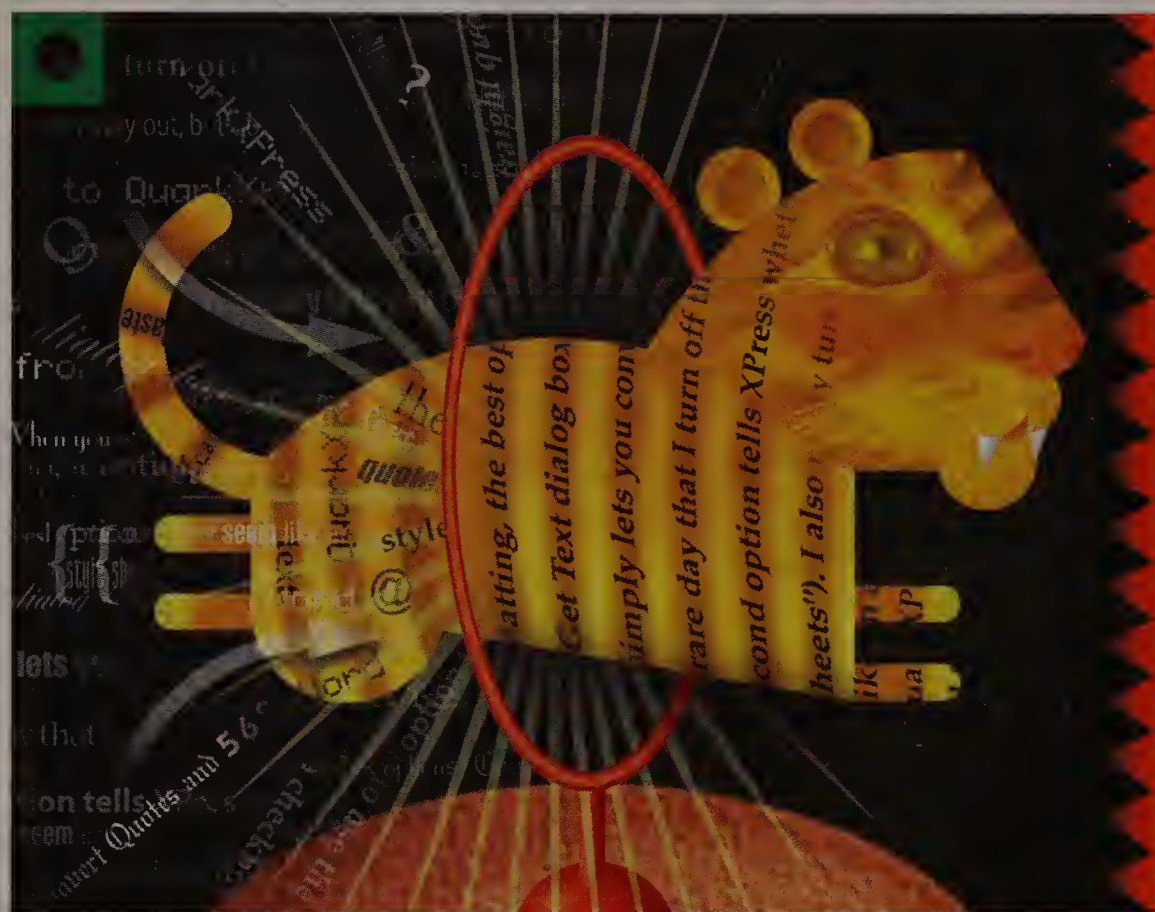
Fortunately, you can improve QuarkXPress's performance and save yourself the time and trouble of reapplying formatting by following a few rules and procedures. Note that this article addresses the import of Microsoft Word documents because they're the least altered by XPress. However, most word processors can save files in Word format, so you can benefit from this information even if you don't use Word.

Get That Text

The Cut and Paste commands may seem like an easy way out, but do yourself a favor and don't try to cut text from Word and paste it into XPress. The text usually comes through, but it loses all formatting. When you need to maintain style sheets, bold and italic text, font size, or other formatting, the best option is to use the Get Text command, located in the File menu.

The Get Text dialog box has two check-box options: Convert Quotes and Include Style Sheets. The first simply lets you convert straight quotes to curly quotes and double hyphens to em dashes.

The second option tells XPress whether to read the file's style sheets (see the sidebar "Importing Word's Styles"). When you don't select Include Style Sheets, the imported text is tagged with the current style sheet *and* unwanted



local formatting to match its appearance in Word. Even worse, applying a new style sheet has little or no effect on this text. That's why I always turn on Include Style Sheets when importing Word files.

Lost in Translation

Because XPress and Word have different feature sets, importing formatted text files isn't always seamless. For instance, XPress converts Word's tables to tab-delimited text. XPress also ignores Word's page geometry (including columns, placed text blocks, and margins) and paragraph autonumbering. Word's footnotes show up at the end of an imported text file. And Word's drop caps and other fancy formatting such as borders and shading rarely import properly.

There are tricks around two of these shortcomings. To preserve a table you

painstakingly built in Word, save it as a PDF file and then import it into an XPress picture box. (Of course, you can't edit the table later, not even to change the typeface.) To keep autonumbering, save the Word file as a Word 5.0, 5.1, or 6.0 document before importing it.

A Character Study

Despite Quark's claims to the contrary, you may be in for trouble when you import Word for Windows documents into QuarkXPress for Macintosh. I've seen all kinds of weirdness, most frequently when I import "special" characters such as curly quotes and em dashes, which often translate into unexpected and undesired glyphs. The best solution I've found is to open the Windows file in a Mac version of Word and then save the

continues

Importing Word's Styles

THE MOST IMPORTANT STEP YOU CAN TAKE WHEN IMPORTING A Microsoft Word document into a QuarkXPress file is to make sure the style-sheet names are the same in both documents. The formatting can be wildly different, but as long as the style-sheet names are the same, XPress can swap Word's definitions with its own.

1 Except for the occasional use of italics or other means of emphasis, use Word's style sheets, not local formatting (see "Get Rid of the Plus Sign").

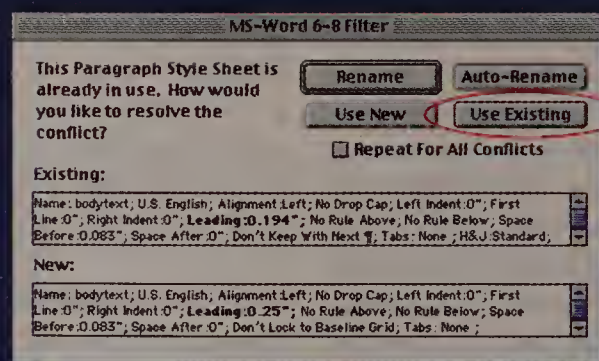
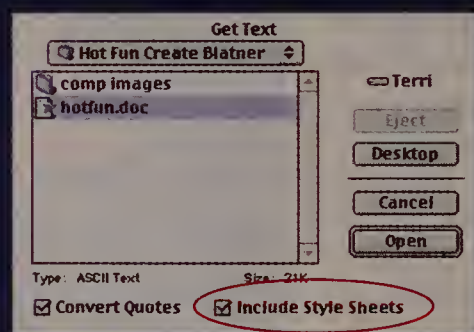
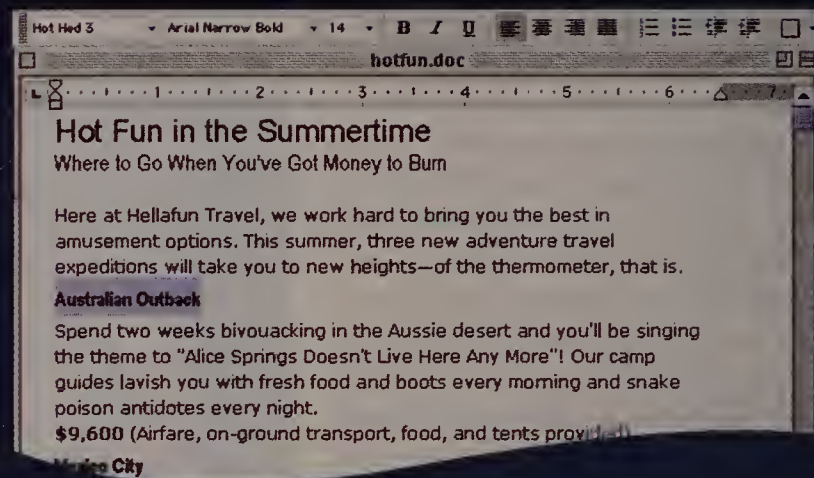
2 When you import the document into XPress using Get Text, make sure you turn on Include Style Sheets.

3 If the styles are defined differently in the two programs, XPress asks you which version you want to use. Choose Use Existing, which strips out the Word definitions and applies the XPress styles.

4 Word sometimes saves extraneous style sheets—such as the character style called Default Paragraph Font—which you may now want to delete to keep things tidy.

TIP: To make sure you've got the same style-sheet names in both programs, import some Word text into an XPress document with different style-sheet names. XPress automatically adds the Word style-sheet names to the Style Sheets list, where you can redefine them at will.

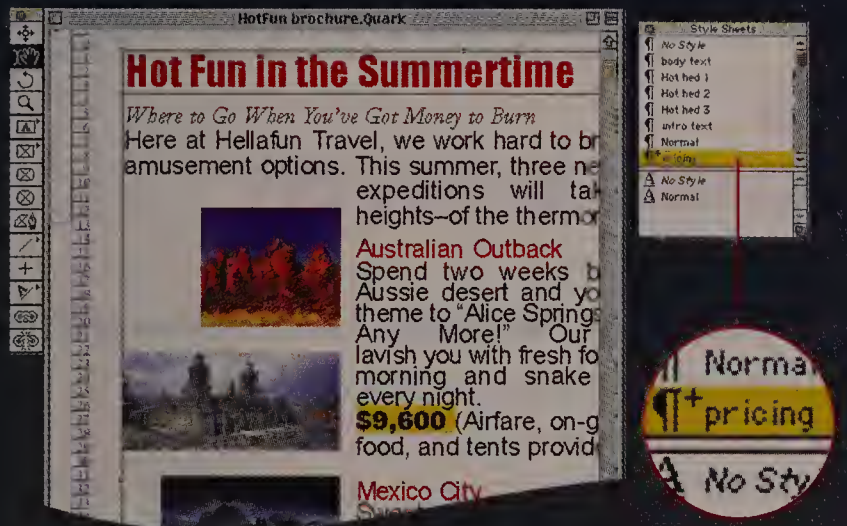
Translating your styles cleanly from Word to XPress is easy:



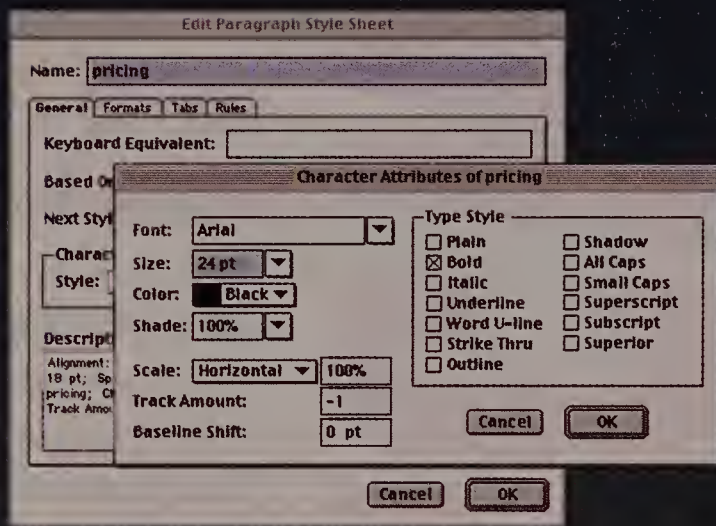
Get Rid of the Plus Sign

IT'S A COMMON PROBLEM: BEFORE YOU GET A WORD document, someone selects all the text and changes its font and size. Because the formatting was applied locally rather than by changing style sheets, all the local formatting remains when you import the document into XPress. When you try to apply a new style sheet, the text doesn't take on the new style properly.

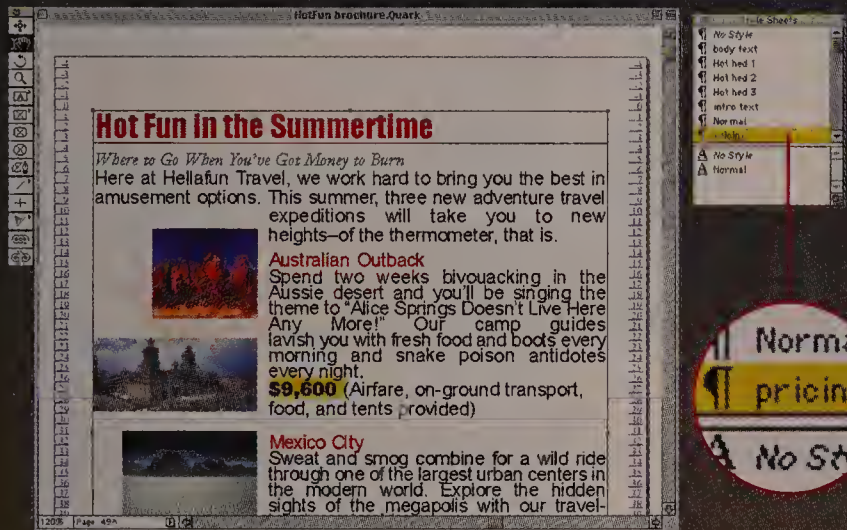
One way to jump this hurdle is to go to XPress's Style Sheets palette and apply No Style to the text first; then apply the style sheet. However, this wipes out all local formatting, including any bold or italic words you might need to keep. Here's a technique to strip out the unwanted local formatting while retaining the formatting you want:



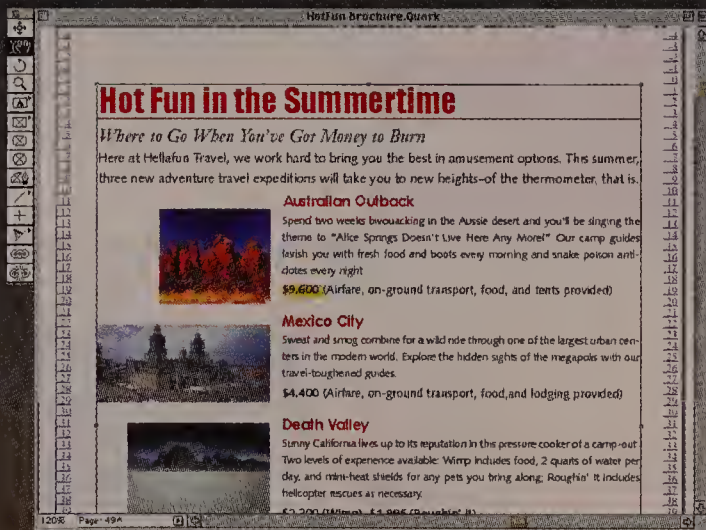
- 1 Click in the text, and you'll see the plus sign in the Style Sheets palette, indicating that there's local formatting.



- 2 Edit the XPress style sheet definition so it matches the imported Word text characteristics.



- 3 Click on Save in the Edit Style Sheets dialog box. Notice that the plus sign is gone from the Style Sheets palette.



- 4 Now edit the style sheet definition again, resetting it to the formatting you desire. Voilà—the unwanted local formatting disappears, leaving the stuff you want behind.

document under a new name before importing it into XPress.

No matter what import problems you encounter, make sure to download the latest import filters from www.quark.com/files.

The Last Word

Even if XPress does someday include a word processor, we will still have to deal with the millions of word processing files out there. With careful planning and strict use of style sheets, you

won't be at a loss for Word. **m**

DAVID BLATNER is the author of *The QuarkXPress 4 Book* (Peachpit Press, 1998) and three QuarkXPress videos from Learnkey. You can find his Web site at www.moo.com.

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Put Your Work under Lock and Key

COPYRIGHT PROTECTS YOUR CREATIONS

by Susan P. Butler

You've sweated over your creations, investing time and energy in them. Then someone comes along and rips them off. Your effort is disregarded, and your reputation as an artist—and your income—may even be threatened. You can defend yourself if you're aware of your rights. You need to understand copyright law.

Copyright law is complex, but knowing a few basics can help you protect your creations. It's important to understand the legal rights of a copyright owner, the types of work copyright law protects, and how to protect your work.

Your Rights

If you come up with ideas and illustrate, design, compose, or otherwise create original work, you might be what's called an *author* under copyright law. Authors are automatically copyright *owners* (until they sell those rights to others). Copyright owners may prevent others from reproducing their work, distributing copies of their work to the public, performing or displaying their work to the public, and making derivative works from their original creations.

A recent court case provides an example. The symbol denoting The Artist Formerly Known As Prince is a famous design. Someone thought the symbol was so cool that he made a guitar in its shape. He allegedly showed his guitar to The Artist—and then sued him for copyright infringement when The Artist made his own guitar in a similar shape.

A court ruled that the first guitar was derivative of the original symbol design, because it recast the copyrighted design in a new work. The Artist, as owner of that copyright, may prevent other people from making derivative works. Therefore, The Artist could sue



the guitar designer for infringement—not the other way around.

What Copyright Law Protects

In the United States, copyright law protects only certain types of work that meet certain specific requirements. For one, the work must be expressed and fixed in a tangible medium.

A Good Idea Is Not Enough You may have a phenomenal idea, but copyright law doesn't protect ideas. It protects only your *expression* of an idea.

Say you want to make a digital video of people talking about Internet privacy. You plan to shoot your subjects in unusual locales and use uncommon camera angles and lenses to enhance the movie's emotional effect. Copyright law doesn't protect the idea of filming people talking about privacy; however, it may

protect the details—the original way you express your vision.

To buy a camera, you have to sell your idea to potential funders. You tell them your plan in a face-to-face meeting because you never know where a written plan might circulate. Guess what? You just blew your copyright protection.

Before copyright law protects your expression, you must fix the expression in a tangible medium where it can be perceived, reproduced, or communicated. In this case, you could save a description of your digital-video project's locations, lenses, and camera angles in a word processor. If you're composing music, you could record it on digital audiotape (DAT). Or you could create art in an illustration or image-editing program and save it as an electronic file.

continues

Once you fix your expression in a tangible medium, you can determine whether it's the type of work that copyright law protects: an original work of authorship.

No Copying Allowed A work of authorship is essentially an original creative work. *Originality* in this context means that the work must be an *independent* creation—not a copy of someone else's work. Spending a lot of time or using mechanical skills to create something does not necessarily make it "original." The work must be an expression of an individual's personality or distinct talent.

In the United States, copyright law protects only the following original works of authorship:

- Pictures, graphics, and sculptures: two- or three-dimensional works such as maps, charts, diagrams, models, technical drawings, fine art, graphic art, and photographs. (See "A True Original" for an explanation of why mere snapshots don't count.)

- Motion-picture and other audio-visual works: series of related images, with sounds, to be shown by means of machines or devices such as projectors and electronic equipment. Music and other sounds are considered part of an audiovisual work unless they become separate works (for example, part of a soundtrack album).

- Musical works: music with lyrics, or instrumental music that has rhythm, melody, and harmony.

- Sound recordings: the result of fixing a series of musical, spoken, or other sounds onto something tangible, such as DAT. (The copyrighted recording is the sound you hear, not the physical tape.)

- Compilations: original arrangements of a number of other works. For example, a ten-track music CD is a compilation of ten separate musical works and sound recordings. A Web site could be a compilation of many pages of individual works of authorship.

- Derivative works: new original expressions created by recasting, transforming, or adapting an existing work. Transforming a photograph into a graphic illustration may make it a derivative work. For an example of this transformation, see the sidebar "Graphic-Artist Gotchas."

Also protected by copyright law are literary works (including computer programs), dramatic works, pantomimes and choreography, and architecture.



A True Original Not every photograph is copyrightable. To create original works of authorship, photographers must add their vision. This photo's unique lighting, posing, and expression make it an original.

If your work doesn't fall into one of these categories, federal copyright law won't protect it. For example, the law won't protect ideas, titles, facts, data, and common sounds because they don't fit the legal definition of an original work of authorship.

U.S. Protection

When you create an original work of authorship, your rights begin at the moment you fix your creation onto a tangible medium of expression. But there are additional steps you may want to take, such as registering your work and embedding digital watermarks.

Although you don't have to register your work with the U.S. Copyright Office

to own a copyright, you can't sue anyone for infringement of your copyright in the United States until you register it. You also receive other legal benefits if you register your work.

The registration process is fairly simple: just complete an application and pay a filing fee of \$30 to the U.S. Copyright Office. You can get instructions and proper forms for free from the Copyright Office (202/707-3000 for general information, 202/707-9100 for forms; www.loc.gov/copyright). Some companies try to sell these same copyright packets—but don't fall for the scam.

If you plan to post your work on the Web, you should also consider digital

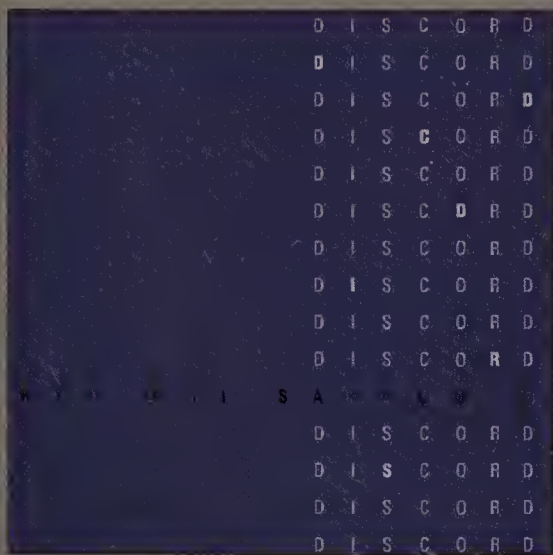
GRAPHIC-ARTIST GOTCHAS

DESIGNERS MAY FIND IT HARD TO determine where the legal definition of *originality* begins. Copyright doesn't protect the formatting, layout, or arrangement of material on a page; the selection of graphic elements such as typography and typeface, calligraphy, color, and lettering; or selection and creation of standard ornamentation or familiar designs and symbols.

That's why the cover of Ryuichi Sakamoto's *Discord* music CD is not copyrightable (see "Not Legally Original"). The cover is visually appealing, but the law says it doesn't have sufficient original creativity to be copyrightable in the United States. Copyright laws in other countries may allow protection, however, depending on their definition of a work of authorship. The *Discord* cover's creative director was Norika Sky-Sora, the art director was Hideki Nakajima, and the designer was Yoshinori Ochiai for Nakajima Design.

Even if you added a photo of the musician, drew the letters for the CD's title, and combined the elements in a layout, the cover still wouldn't include enough creative content to be an original work of authorship according to U.S. law.

On the other hand, transforming the likeness of Sakamoto into an original expression, as Giles Dunn of Punkt did with the cover of Sakamoto's *Cinemage* CD (see "Copyright This"), establishes it as a work of authorship because it's more than a layout or selection of material. The designer altered the photo by softening the outlines of the face, making the background part of Sakamoto's face, and adding colors. The face becomes more than a photographic image. As an entire piece, it's an original artistic work.



COURTESY OF RYUICHI SAKAMOTO AND KAB AMERICA

Not Legally Original U.S. law says that, despite its powerful design, this CD cover is not protected by copyright because it is not sufficiently original in its expression.



© 1999 KAB AMERICA

Copyright This This CD cover is protected by copyright because it transforms the likeness of a musical artist into an original expression. It appears courtesy of Ryuichi Sakamoto and KAB America.

watermarking, which "fingerprints" your files. Should you then find unlicensed copies of your watermarked creations elsewhere, there's a good chance that you can track them to the purchaser who made the illegal copies. Two digital watermarking companies are Digimarc

(800/344-4627, www.digimarc.com) and Liquid Audio (www.liquidaudio.com).

International Protection

When you post your copyrighted work on a Web site, everyone in the world can admire it. Anyone can also make a copy

with one mouse-click. Are you out of luck when the thief is working outside your country? Global copyright protection is a little more complicated than domestic protection, but in most of the world you still have rights.

For example, a photograph created by a Parisian photographer recently appeared on the Web site of a Seattle company that sells posters. However, the photographer had authorized the photograph for use only in a promotional portfolio and for postcards sold in Paris.

Even though he shot the photograph in Paris and it never *legally* left French soil (because it didn't do so with his permission), United States copyright law protects the work when it's on U.S. soil. Therefore, the photographer could prevent the Seattle company and its Web site from displaying the image in any form on the Internet and from distributing (selling) the photograph as a poster.

Practically every country is a party to international copyright treaties; that is, national governments agree to protect copyrights for citizens in other nations. Usually the law of the country in which someone rips you off applies. Under some circumstances, you can sue the thief in a court in your own country.

Thanks to these treaties, copyright laws around the world are basically similar. However, laws vary on the specific rights and how long protection lasts for certain types of works, such as photographs and sound recordings. The World Intellectual Property Organization provides basic international copyright information at www.wipo.org. For legal advice, contact a copyright lawyer who practices internationally.

Protecting your copyright internationally can be a hassle, but at least you're spared one bit of paperwork. Unlike the United States, very few other countries require you to register your copyright before filing a lawsuit; few even have a registration office.

Renown without Rip-off Few artists prefer to labor in obscurity. Recognition is sweet—as long as it doesn't open the door to theft. Know your rights, and you can protect your work. **m**

SUSAN P. BUTLER is a new-media and entertainment attorney in Northern California. She writes a monthly legal column for ZDNet and is currently completing *The E-business Legal Kit for Dummies* (IDG Books Worldwide), due out this fall.

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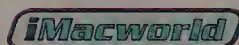
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Jacob K. Javits Convention Center, New York City

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Box					
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Registration Package Selection & Fees

Pre-Conference Workshops: July 18, 2000, Conference Programs & Workshops: July 18-21, 2000, Exposition: July 19-21, 2000. All Conference Sessions, Keynote Address and Vision Thing Live are on a first-come, first-served basis with the exception of the Pre-Conference Workshops.

(Indicate your Workshop selection code)

	Early Discount by Jun 19	Regular Price after Jun 19
<input type="checkbox"/> Package 1: Super Pass	\$1,195	\$1,295
Includes: Pre-Conference Workshops, MACWORLD/Pro Conference Sessions, MACWORLD Users Conference Sessions, Lunch, Warm-up Rally, Keynote Address, Vision Thing Live, MacBeginnings Sessions, Exhibits		
<input type="checkbox"/> Package 2: MACWORLD/Pro Conference	\$845	\$895
Includes: MACWORLD/Pro Conference Sessions, MACWORLD Users Conference Sessions, Lunch, Warm-up Rally, Keynote Address, Vision Thing Live, MacBeginnings Sessions, Exhibits		
<input type="checkbox"/> Package 3: MACWORLD User I	\$195	\$245
Includes: MACWORLD Users Conference Sessions, Warm-up Rally, Keynote Address, Vision Thing Live, MacBeginnings Sessions, Exhibits		
<input type="checkbox"/> Package 4: MACWORLD User II	\$545	\$595
Includes: Pre-Conference Workshop, Lunch (Workshop Day ONLY), MACWORLD Users Conference Sessions, Warm-up Rally, Keynote Address, Vision Thing Live, MacBeginnings Sessions, Exhibits		
<input type="checkbox"/> Package 5: Workshop ONLY	\$395	\$445
Includes: Pre-Conference Workshop, Lunch (Workshop Day ONLY), Warm-up Rally, Keynote Address, Vision Thing Live, MacBeginnings Sessions, Exhibits		
<input type="checkbox"/> Package 6: Exhibits ONLY (July 19-21)	\$10	\$25
Includes: Exhibits and MacBeginnings Sessions ONLY. (Does NOT include admission to the Keynote Address, Warm-up Rally, Vision Thing Live)		

A-MW4

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- ☐ Check here if you DO NOT wish to receive product information from third parties (exhibitors) via email.

Pre-Conference Workshop Key

Tuesday, July 18: 12:00 pm – 7:00 pm

Please refer to pages 6 – 8 for complete descriptions.

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WB: Desktop Publishing: The Big Picture
WC: Managing Shared Macintosh Computers with Apple Macintosh Manager
WD: The QuickTime Professionals Workshop
WE: How to be a Mac Power User
WF: Getting Started with Applescript
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WH: RealAudio & MP3 on the Mac: The State of the Art Macintosh Audio
WI: The Filemaker Workshop
WJ: Mac Efficiency 101
WK: Streaming Video Production Workshop
WL: Final Cut Pro
WM: Current Macintosh Administration Strategies
WN: Getting Started with Multimedia
WO: Web Animation Essentials, Tools and Techniques
WP: Working with PDF

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Sole Proprietor
☐ For Myself as a Consumer

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☐ Gaming/Game Development
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☐ 21. Manufacturing (Non-computer Industry)
☐ 22. Marketing/Sales/PR/Communications
☐ 23. Multimedia
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☐ 25. Printing/Publishing
☐ 26. Publication/Association
☐ 27. System Integrator
☐ 28. Transportation/Utilities
☐ 29. Website Admin/Content Development
☐ 30. Other

What is your job function?

(Check only one)

- ☐ 31. Art Director/Graphics/Design/Digital Art
☐ 32. Consultant
☐ 33. Controller/Treasurer/Accounting/CFD
☐ 34. CEO/President/Owner
☐ 35. IT Executive (CIO/CTD/VP)
☐ 36. Editorial/Writing
☐ 37. Educator/Teacher
☐ 38. Engineering/Scientific/R&D

- ☐ 39. Human Resources
☐ 40. Management/Department Head
☐ 41. Marketing/Sales/PR/Communications
☐ 42. Network Management
☐ 43. Professional (Lawyer, Doctor, etc.)
☐ 44. Programming/Analysis
☐ 45. Purchaser/Corporate Buyer
☐ 46. Software Developer
☐ 47. Training
☐ 48. Web Admin/Content Developer
☐ 49. Other

What is the size of your organization?

- ☐ 50. Under 50
☐ 51. 50-99
☐ 52. 100-499
☐ 53. 500-999
☐ 54. 1000 & Over

Which personal computers do you use?

(Check all that apply)

- ☐ 55. Powerbook/Powerbook G3
☐ 56. PowerMac/PowerMac G3
☐ 57. iMac

- ☐ 58. iBook
☐ 59. PowerMac G4
☐ 60. iMac DV
☐ 61. Macintosh Workgroup Series
☐ 62. IBM PC or compatible desktop
☐ 63. IBM Laptop/Notebook
☐ 64. Other

What is your role in making purchases?

- ☐ 65. Final Decision Maker
☐ 66. Recommend Product or Vendor
☐ 67. Develop Specifications
☐ 68. No Role

What is your annual purchasing budget?

- ☐ 69. 0 – 25,000
☐ 70. 25 – 100,000
☐ 71. 100 – 500,000
☐ 72. 500 – 1,000,000
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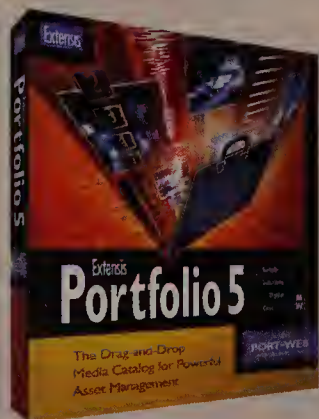
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Easy Updates with Dreamweaver

MAKE QUICK WORK OF SITE UPDATES WITH TEMPLATES AND LIBRARIES

by Mike Wooldridge

For a Web developer, nothing beats seeing months of hard work pay off with a successful site launch. But once a Web site is up and running, it's often the routine maintenance tasks and site updates that take up most of your time. Such day-to-day work can be short on creativity and long on repetition.

Good Web-editing software can take the drudgery out of maintaining large sites by helping you streamline the process of creating and updating elements that appear on multiple pages. With Macromedia Dreamweaver's templates and libraries, you make changes to just one file and then let Dreamweaver automatically make those changes on multiple pages on your site.

A routine task that might take a half hour if you had to code dozens of pages by hand can take just a few minutes. And unlike a text-based Web editor (such as Bare Bones' BBEdit), which gives you search-and-replace capabilities across multiple files, Dreamweaver's visual interface lets you make complex changes without ever having to touch an HTML tag.

To help you exploit their power, I'll discuss using templates and libraries and how each works. (See "Automating with Templates" and "Automating with Library Items" for step-by-step instructions.)

Stepping Up to Templates

Dreamweaver's templates feature can be a tremendous time-saver when you're building and updating frequently used layouts. It lets you create multiple Web pages based on a generic page layout. To modify pages, all you have to do is make changes to a template and have Dreamweaver propagate those changes to every page that's based on the template.

A site can have more than one template. In fact, you can build a different one for each style of page, such as news-



story or employee-bio pages.

Let's say, for instance, that you want to add a Jobs button to a navigation menu that's on every page of your company's site. You make your changes to the template and then have Dreamweaver hunt through the entire site, adding the new button to each page that's based on that template.

Studying Libraries

Library items are great time-savers when you have content that appears many times on a site but not in the same place on every page. That's because they work on the element level (rather than the page level). Let's say your site features ad banners from four different advertisers. You can save each banner as a library item and then add it quickly to other pages by inserting it from Dreamweaver's library palette instead of re-creating it every time.

If later you need to update the banner graphics—for instance, swap in new graphics or change the hyperlink destinations—you simply change the original library items; Dreamweaver updates the different instances of the banners on your site automatically.

What Doesn't Belong

The efficiency gains that templates and libraries can deliver make them well worth your while, even if you're maintaining a small site. For ideas on expanding the capabilities of templates and libraries, go to www.macworld.com/create/2000/07/easy_sb1.html. **m**

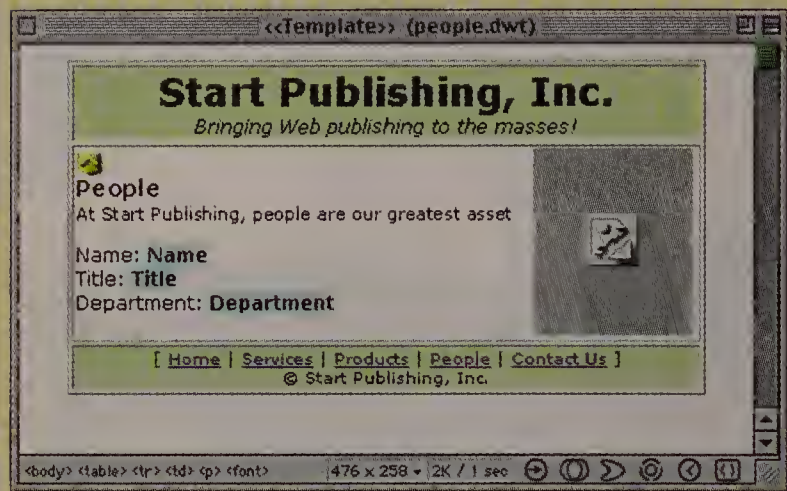
MIKE WOOLDRIDGE is a Web designer and the author of *Teach Yourself Dreamweaver 3* (IDG Books Worldwide, 2000).

continues

AUTOMATING WITH TEMPLATES

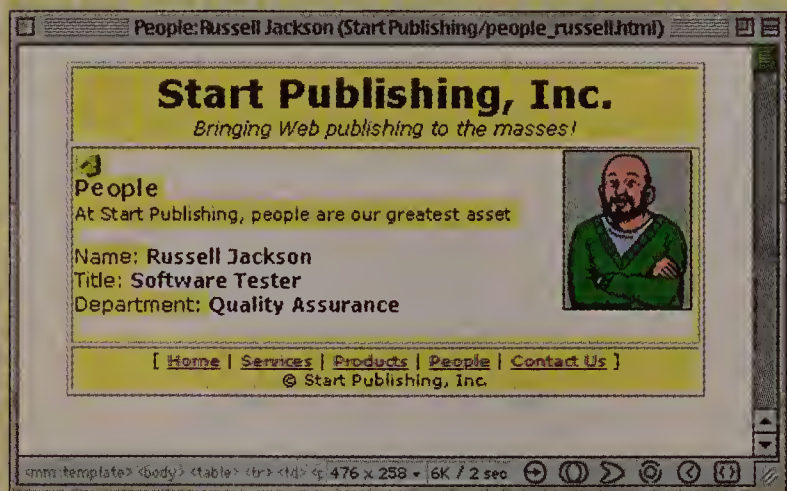
DREAMWEAVER'S TEMPLATES FEATURE LETS YOUR COMPUTER do the grunt work when it comes to updating elements that appear many times on a Web site. There are only a few basics you need to know to get started. Templates have two types of regions: editable and locked. Locked regions are for the content

that doesn't change from page to page, such as navigation buttons and disclaimers. Editable regions are for page-specific elements, such as page titles and body text. By default, all elements of a template start out locked. It's up to you to choose the regions that will be editable on individual pages.

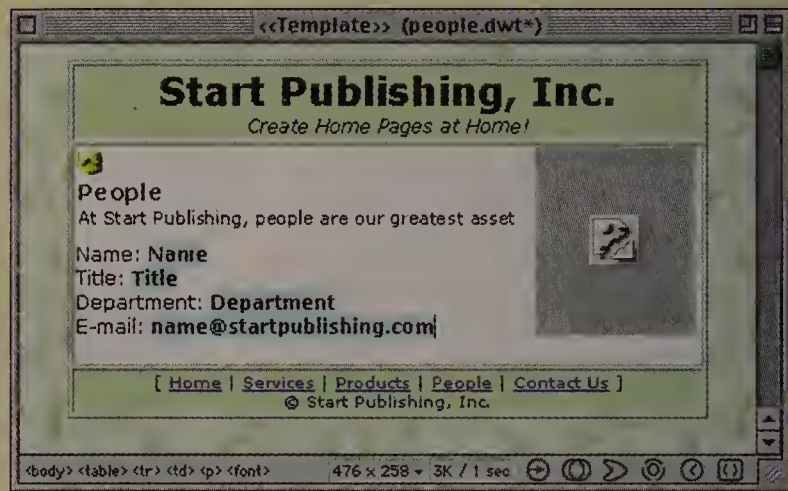


1 Create a template just like you would any other Web page in Dreamweaver. You can build a template from scratch or create it from an already existing Web page. To save your new page as a template, choose Save As Template from the File menu.

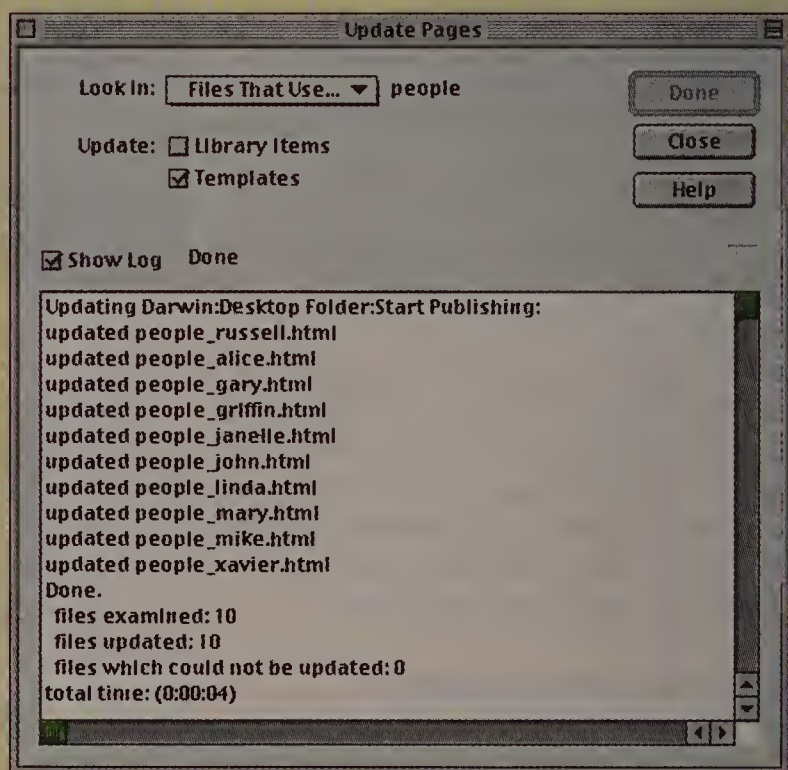
To define a region of a template as editable, click and drag to select it, and then choose Modify: Templates: Mark Selection As Editable. Only editable regions (which Dreamweaver highlights in blue) can be changed in Web pages that are based on a template.



2 To create a Web page based on a template, choose File: New From Template. Then make the changes you want (such as adding a graphic or text) to the editable regions. It's easy to see which regions you can edit, since Dreamweaver highlights the ones you cannot—the locked regions—in yellow. On this employee page, only the personal details and image are editable.



3 If you want to change locked regions in a Web page, you must open the original template file (located in the site's Templates folder) and make the changes. Here, I added a line for e-mail addresses, revised the company slogan, and jazzed up the background.



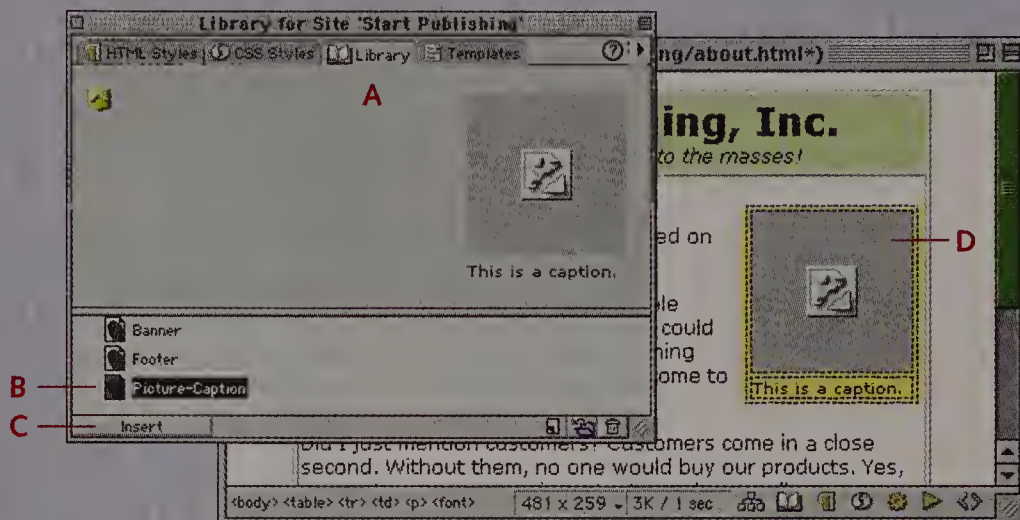
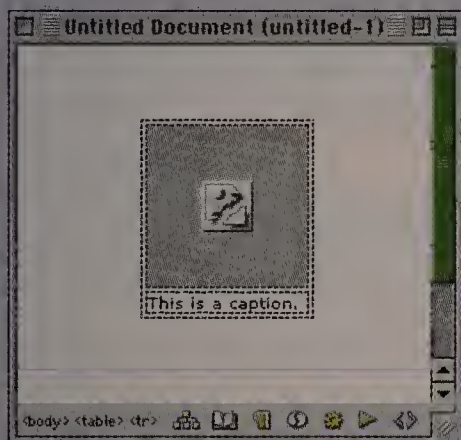
4 Finally, save the edited template. When you do, Dreamweaver will prompt you with an alert box asking if you want to update pages based on the template. Click on Yes, and you're done. The window shown here displays the results of my update. Dreamweaver updated ten of the site's files; I updated only one—the template.

AUTOMATING WITH LIBRARY ITEMS

DREAMWEAVER LETS YOU USE A LIBRARY TO STORE PAGE elements, such as tables, that you'll use over and over again.

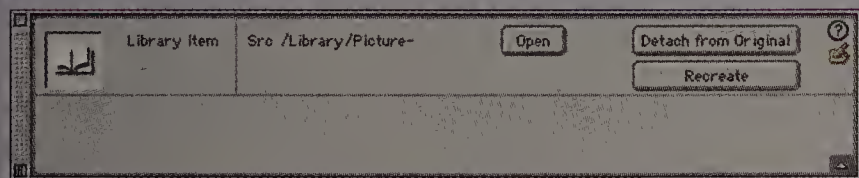
Instances of a library item you've added to a page cannot be edited on a page-by-page basis. Instead, you must open the original library item from the site's Library palette if you want to edit it. When you tell Dreamweaver to apply the changes sitewide, it updates every page that contains an instance of that library item.

Sometimes you'll want the convenience of storing a Web-page element as a library item, but you'll also need the flexibility of customizing the item individually after you insert it into a page. Here's how to do both. I'll use the example of creating a generic, two-celled table that's designed to hold an image and a caption.

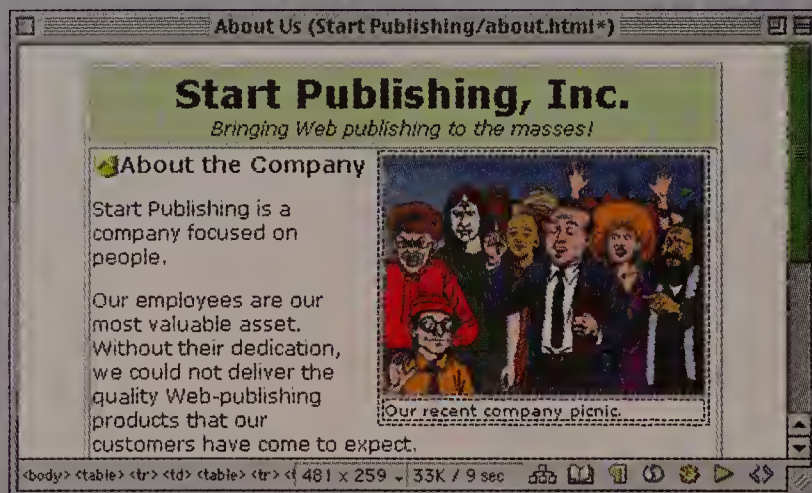


- 1 First, create a two-celled table in the Document window. To save it in your site's library, select it, then choose **Modify: Library: Add Object To Library**. You can use this library item each time you add an image and caption to your site.

- 2 The Library palette displays all the library items available for a site (A). To add this library item to a page, select it in the Library palette (B) and click on **Insert** (C). The table is inserted into your document (D). At this point, you can have Dreamweaver change the table in your document by changing the item in the library.



- 3 When you initially add the two-celled table to a page from the library, you can't customize it because instances of library items are locked. To edit it, you must dissociate it from the library by clicking on the **Detach From Original** button in Dreamweaver's Property Inspector. (If the Property Inspector is closed, open it by selecting **Properties** from the **Windows** menu.)



- 4 Once you detach the table from the library, you can customize the table with an image and caption. However, you can no longer change that instance of the table by changing the original library item.

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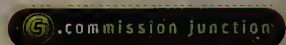
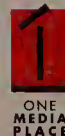
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70,71	Adobe Systems Inc.	—
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45	PowerOn	118

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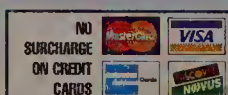
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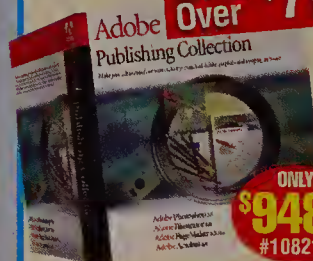


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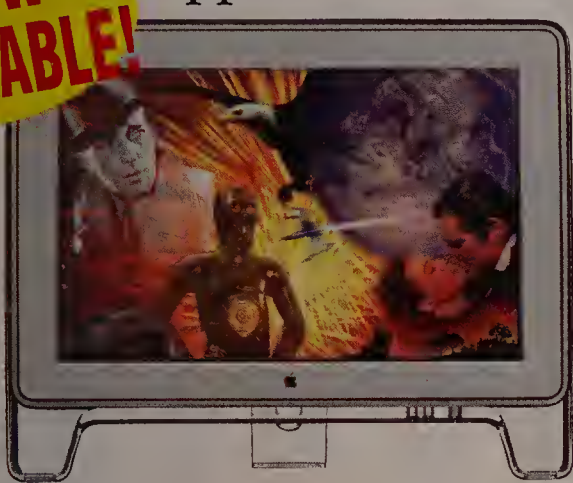
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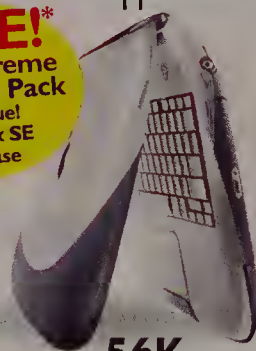
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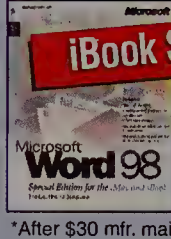
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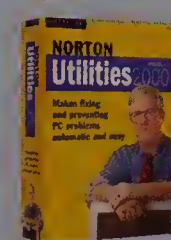
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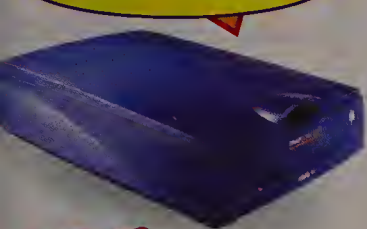
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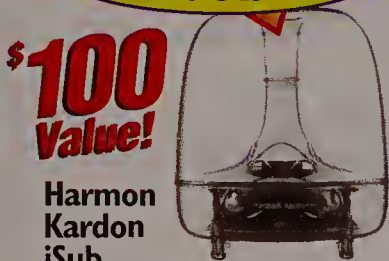
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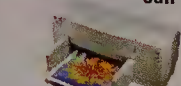
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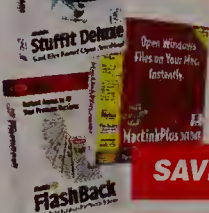
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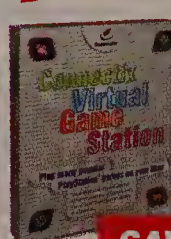


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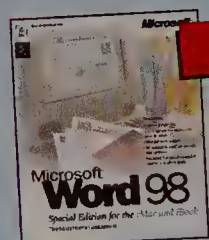


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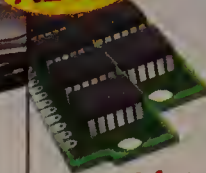
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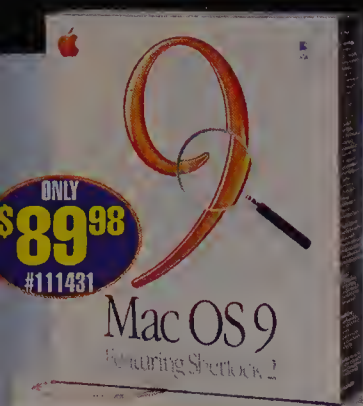
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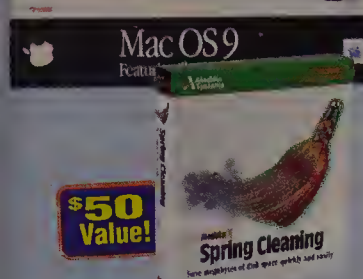
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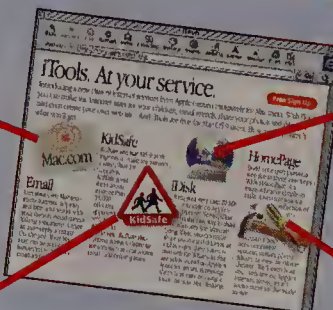
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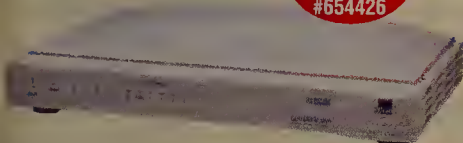
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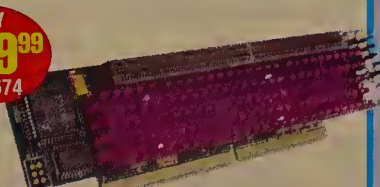
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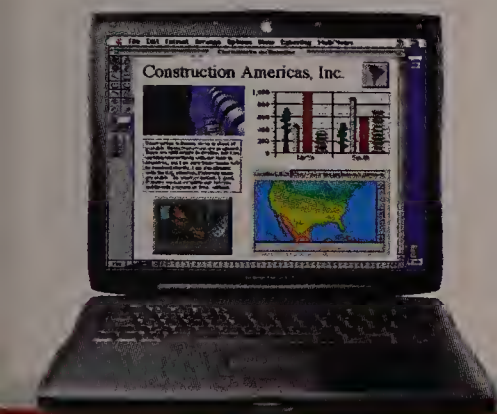
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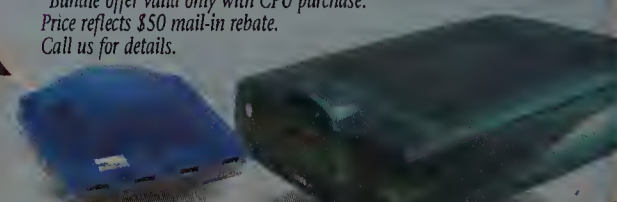
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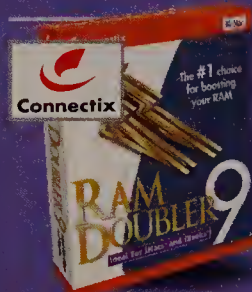
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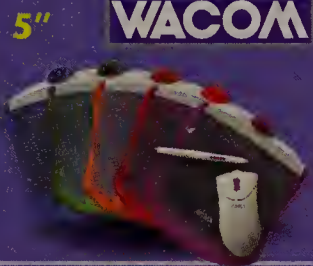
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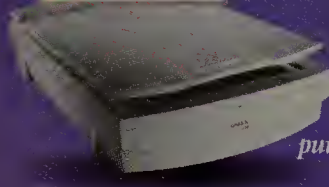


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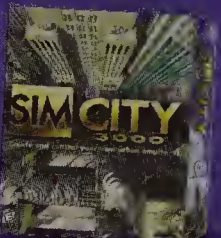


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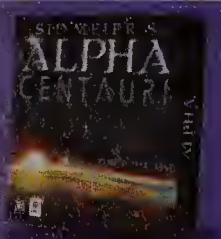
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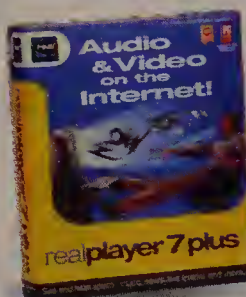
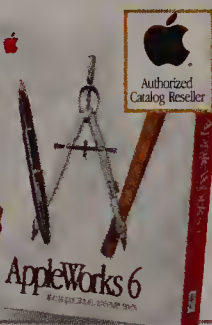


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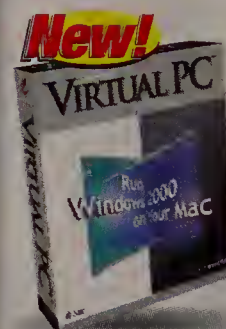
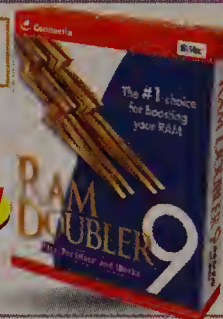
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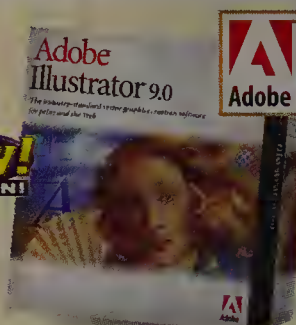


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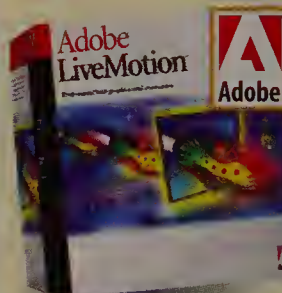
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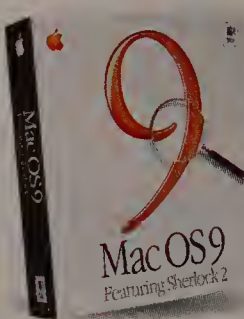


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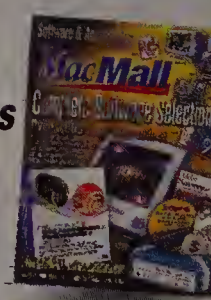
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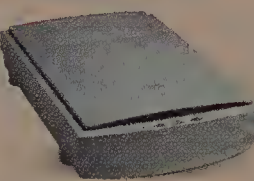
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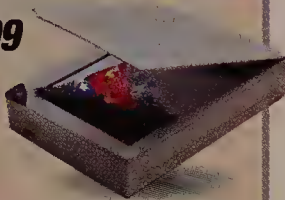
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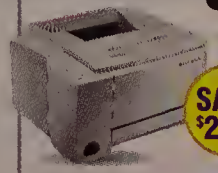
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*Price AFTER manufacturer's \$10 mail-in rebate. Before rebate: is \$99.95. Rebate coupon available at www.warehouse.com/rebate/umax, or call us at 1-800-390-0706 to request one. Offer expires 5/31/2000.

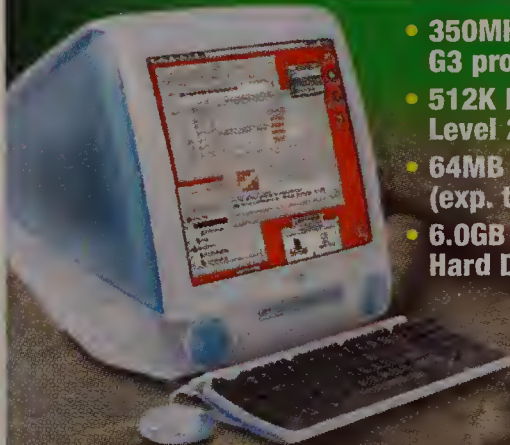
PAGE 3 OF 8

Cooler, Sleeker iMacs - Mixed

1 Apple iMac 350MHz Blueberry

Only \$999!††

Item #CPU1492 Lease It for \$29/mo.‡



- 350MHz PowerPC™ G3 processor
- 512K Backside Level 2 Cache
- 64MB of SDRAM (exp. to 512MB)
- 6.0GB Ultra ATA/66 Hard Drive

- 24x max. slot-loading CD-ROM
- Built-in 56K V.90 modem
- ATI RAGE 128 VR 2D/3D graphics accelerator with 8MB SDRAM (AGP 2X)
- Odyssey audio system from Harman Kardon
- 15" color display • 10/100Base-T Ethernet
- 2 USB ports (12Mbps ea.)
- Support for AirPort 11Mbps wireless networking (antenna built-in; AirPort card optional)

2 Apple iMac DV 400MHz

Only \$1299! each



Lease It for \$38/mo.‡



Includes ALL the GREAT Features of the 350MHz Model - PLUS -

- 400MHz Processor • Slot-loading DVD drive
- Movie-making software • Two FireWire® ports
- 10.0GB Ultra ATA/66 Hard Drive

Blueberry:	Grape:	Strawberry:	Lime:	Tangerine:
Item	Item	Item	Item	Item
#CPU1493	#CPU1494	#CPU1495	#CPU1496	#CPU1497

iDOCK 2 USB MULTIPOINT HUB



- Floppy drive
- Swivel Base
- 4 USB ports
- 2 Serial ports
- 1 ADB port

Only \$259.99!

Item #DEH4620

Includes 3.5 floppy drive!



MYST

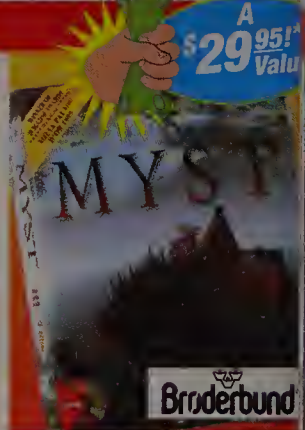
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with any purchase from MacWAREHOUSE

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**Value based on MacWAREHOUSE pricing as of this magazine printing.



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- Designed specifically for use with USB
- Fits the natural shape of your hand; ideal for right- or left-handed users • Manufacturer's 5-year warranty

USB



KENSINGTON

HP DeskJet 970cse Printer



Only \$399.95!

Ask for item #PR15465.

- 12ppm black • 10 ppm color
- PhotoRet III technology • USB compatible
- Black Ink Cartridge, only \$29.99, item #67208.



Sony Digital FD73 Mavica

Only \$499.95!

Ask for item #IN7834.

- 10x optical zoom • E-mail mode • 2.5" Color LCD • VGA resolution • Quick Access 2X Floppy Disk Drive • Picture effect • File copy/disk copy



SONY

WAREHOUSE.com

740 Printer

after rebates, when
purchased with an iMac!

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CALL FOR A
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CATALOG!



ony • Broderbund • VST • Epson • Aladdin • Keyspan • Farallon • Microsoft • Intuit

3 different ways!

3 Apple iMac DV Special Edition

Only \$1499!



Item #CPU1498 Lease It for \$44/mo.*

400MHz PowerPC™ G3 processor
128MB of SDRAM (exp. to 512MB)
ATI RAGE 128 VR 2D/3D graphics accelerator
13.0GB Ultra ATA/66 hard drive
4X max. slot-loading DVD-ROM drive
Built-in 56K V.90 modem
15" color display
512K Backside Level 2 Cache
Harman Kardon Odyssey Audio System
10/100 BASE-T Ethernet
Dual FireWire® ports
Two 12Mbps
USB ports
Support for
AirPort wireless
networking (antenna
built-in; AirPort
card optional)
Pre-installed iMovie
software

*Free 64MB RAM Upgrade AFTER MacWAREHOUSE \$100 mail-in rebate. Before rebate: \$129.95. Installation fee of \$29.95 required. Visit www.warehouse.com/rebate/macwarehouse for mail-in rebate coupon or call us at 1-800-390-0706 to request one. Offer not valid on purchase of 350MHz iMac, or any reconditioned iMac. MacWAREHOUSE reserves the right to terminate this offer at any time. Offer expires 6/30/2000.

Free!

EPSON Stylus 740 Printer

after rebates, when
purchased with an
iMac! Ask for item
#AAP1133.

PLUS...

MacWAREHOUSE special offer!

Free!

64MB RAM Upgrade!

after rebate, when you purchase
an iMac DV or an iMac DV Special
Edition! Ask for item numbers
AAP1115 and INSTL10.
Installation fee required.

*Regular price: \$149.95-\$50 mfr's mail-in rebate=\$99.95. Receive additional \$99.95 mail-in rebate from MacWAREHOUSE with purchase of an iMac. Epson Stylus 740 Printer and iMac must appear on the same invoice. Rebate coupons available at www.warehouse.com/rebate/epson or call us at 1-800-390-0706 to request one. Free printer offer not valid on reconditioned iMac. Offer good while supplies last!



Imega 100MB USB Zip Drive



Only
\$99⁹⁵!

Item #DR9464

Zip Disk sold separately.

Imega 100MB Zip Disks

as **\$8⁹⁹!** each,
low as in 20-pk.



20-pack (gray): only \$179.80, #BND3616.

EtherMac iMac iPrint Adapter with built-in PhoneNet!

Only
\$104⁹⁹!

Item #DEP1734



- Connects your iMac to LocalTalk printers and other Macs
 - Easy plug-and-play installation
- Farallon®**
Ethernet iPrint Adapter for Stylewriter,
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Canon ELURA DV Camera



Was \$1599.95!
Now only
\$1499⁹⁵!

Item #IN8176

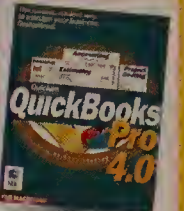
- 12x Optical/48x Digital Zoom
- IEEE 1394 Terminal In & Out
- 2.5" LCD & Color Viewfinder

Canon

Quickbooks Pro 4.0

Only
\$179⁹⁵!

Item #FIN1007



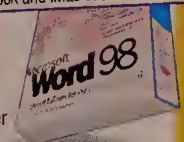
- Timesheet functions
 - Generates customizable estimates
 - Automated job costing
 - Previous data from QuickBooks or Quicken is automatically updated to QuickBooks Pro 4.0!
- Intuit**

Microsoft Word 98

Only
\$89⁹⁵!
after rebate

Item #WP3072

Special Edition!
For iBook and iMac customers only!



Includes Word 98, Internet Explorer 4.5 and Outlook Express 4.5.

*Price AFTER publisher's \$30 mail-in rebate. Before rebate: \$119.95. Rebate coupon in box. Offer expires 7/31/2000.

MICROSOFT OFFICE 98

Microsoft®

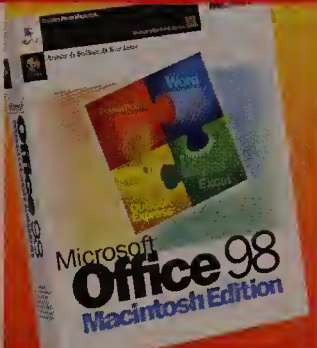
Includes:

- Word 98 • PowerPoint 98
- Excel 98 • Outlook Express.

Upgrade only
\$249⁹⁵!

Item #UPG0778

Microsoft Office 98 Full Version
\$1150 \$419.95



EPSON STYLUS COLOR 740i PRINTER

- Blueberry cover standard
- 1440 x 720 dpi with smaller ink drops • 6ppm blk; 5ppm clr
- USB/Mac serial compatible

\$129⁹⁵!
Only after \$50 rebate
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*Price BEFORE manufacturer's \$50 mail-in rebate is \$179.95-\$50 rebate=\$129.95. Rebate coupon available at www.warehouse.com/rebate/epson, or call us at 1-800-390-0706 to request one. Offer expires 7/31/2000.

Other color
covers available for
only \$14.95 each!
Call for details.

EPSON®



Black Ink Cartridge: PA1582.....\$25.99

Leasing terms are available to business customers with approved credit on product orders where at least one product totals \$750 or more. Payments are based on a 48-month Lease. Leasing terms subject to change without notice. Call for complete details. Other leasing terms available.

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by 11pm (E).

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Overnight delivery!

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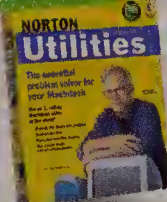


MacWAREHOUSE

NEW! Apple PowerBook G3

Apple • Newer Technology • Global Village • Imation • 3Com US Robotics • Belkin

\$50 UPGRADE REBATE! Norton Utilities 5.0



Upgrade only
\$49⁹⁵!

Item #UT11546

- Prevents computer disasters
- Speeds recovery from emergencies

*Price before rebate is \$99.95. Rebate applies to owners of previous versions of Norton Utilities for Mac and Norton AntiVirus for Mac. Rebate coupon in box. Offer good through life of product.

USB to Serial

Only
\$59⁹⁹!

Item #DAD1665

- Connect serial modems, digital cameras, graphic tablets, printers, and PDAs
- Supports either the Mac modem or printer port

Palm VII Connected Organizer with Serial Kit

Only
\$449!

Item #BND3824

Features Web Clipping to retrieve stock quotes, and other Internet* information.

*Internet access requires activation and a monthly Palm. Net service fee. Service provided by 3Com. See coverage maps for 260 Metropolitan areas at www.palm.net.



Palm VII
Connected Organizer

New! Olympus D-360L



Only
\$299⁹⁵!

Item #IN8569

- 2x digital zoom • 8MB Smartmedia card included
- 1.3 Megapixel • 1.8" Ultra-bright color LCD

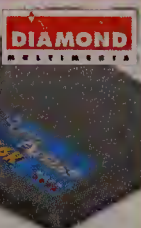
SupraExpress V.90 56K* Modem

Only
\$78⁹⁹!

Item #DMD3503

- 56K ITU Standard
- 230Kbps throughput
- Voicemail/Caller ID

*Capable of receiving data up to 56Kbps. Actual send and receive speeds may vary.



HP LaserJet Printers

As low as

\$759!

HP LASERJET 2100M

- Prints 10ppm
- 1200 dpi resolution
- HP PostScript Level 2
- LocalTalk connectivity

Item #PR14691

Black Toner Cartridge (2100): Item #PA1871, only \$89.99

HP LASERJET 4050N

Only
\$1499⁹⁵!

Lease It for \$43/mo.*

Item #PR14947

- Prints 17ppm
- 1200 dpi max. res.
- 100MHz RISC processor
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HP LASERJET 5000N

Only
\$1997⁹⁵!

Lease It for \$58/mo.*

Item #PR13443

- Prints 16ppm
- Up to 1200 dpi max. res.
- Prints sizes 3"x 5" thru 11"x 17"
- Black Toner Cartridge (5000): Item #PR13742, only \$139.99

HP LASERJET 8000N

Only
\$2499⁹⁵!

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Item #PR13724

- Prints 24ppm
- Up to 1200 dpi max. res.
- 133MHz RISC processor
- Black Toner Cartridge (8000): Item #63223, only \$155.99



HP LaserJet 2100 shown.

HP LASERJET 8100N

- Prints 32ppm • 1200 dpi

Item #PR14315

Lease It for \$81/mo.*

\$2799⁹⁵

Black Toner Cartridge (8100): Item #PA1662, only \$178.99

HP COLOR LASERJET 8550N

- Prints 24ppm blk/6ppm color • 600 dpi

Item #PR16146

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\$5759⁹⁵

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MAC OS 9

Only
\$99⁹⁵!

Item #SYS1012

Features you'll love!

- Sherlock 2: Easily find people, news, and shopping on-line!
- Easy-to-use, functional interface
- Compatibility with popular search engines such as AltaVista, CNET, Excite, Infoseek, and Lycos
- Plug-ins that search popular sports, financials, and news sites such as CNN and ESPN
- Ability to search multiple shopping and e-commerce sites at the same time
- Built-in Open GL for accelerated 3-D graphics and an improved gaming experience

*Shipped in promotional packaging. While supplies last.

*iTools is free to Macintosh® users running the Mac OS 9 operating system, and can be accessed at www.apple.com. See box for details.

FREE**
iTools from Apple
with purchase of
Mac OS 9!

Mac OS 9
Featuring Sherlock 2

PLUS...

FREE*
SOFTWARE BUNDLE!
Including Spring Cleaning and
many other software titles, with
the purchase of Mac OS 9.
Ask for item #AAA1043.



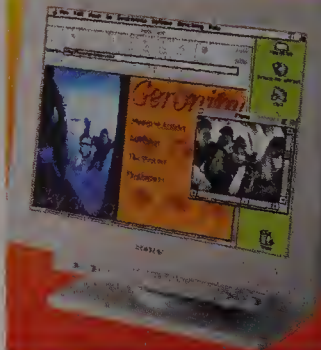
SONY G500 21" MONITOR

SONY

- 21" screen (19.8" viewable image size)
- .24 aperture grille
- 2048 x 1536 @ 75Hz with adapter

Only
\$1179⁹⁵!

Item #MON1041



IOMEGA 100MB ZIP DISKS



FREE
Zip Storage Tower
when you buy any
Zip Disk 10-pack!
While supplies last.
Item #AA1780.

New Low Price!
\$8⁹⁹!
each, in 20-pack

Item #BND3616

- 100MB Zip Disk Gray (20-pack) BND3616 \$179.80
- 100MB Zip Disk Color (10-pack) BN5265 \$99.95



Fuji CD-Rs

Only **89¢** each,
in 50-pack spindle

Ask for item #ME8599

- 74 min. • 650MB

FUJIFILM



3Com U.S. Robotics 56K* V.90 FaxModem

Only **\$99⁹⁹!**

Ask for item #DMD3448.

- Manufacturer's lifetime warranty
- *Capable of receiving data up to 56Kbps. Actual send and receive speeds may vary.

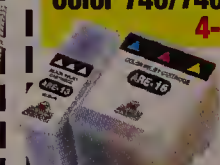


Ink cartridges for Epson Stylus Color 740/740i/760/860/1160

4-pack+1 FREE

As low as **\$18⁹⁹!** each, in 4-pack

Black: Item #PA2315 \$75.99
Color: Item #PA2317 \$75.99



FREE*
InkJet Cartridge
with the purchase
of inkjet cartridge
4-pack.

*Free cartridge shipped in package.

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up to 500MHz!

CALL FOR A **FREE**
FULL-COLOR
CATALOG!



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Data CommWAREHOUSE

Hewlett Packard • ViewSonic • Iomega • Olympus • BroderBund • Amazon • Targus



500MHz PowerBook G3s!

- Up to 500MHz PowerPC G3 processor
- Up to 128MB PC100 SDRAM (expandable up to 512MB)
- 6X DVD-ROM drive
- Up to 12.0GB Ultra ATA/66 hard drive
- 56K V.90 modem
- 1MB Backside Level 2 Cache

- 14.1" active-matrix display
- Support for optional AirPort card for wireless connection to your network or the Internet
- Two 400Mbps FireWire® ports
- Two 12Mbps USB ports

NEW! PowerBook G3/400MHz processor

64MB SDRAM • 6.0GB Ultra ATA/66 HD • DVD-ROM

2 FireWire® ports

Item #CPU1580

\$2499

Lease It for \$73/mo.*

NEW! PowerBook G3/500MHz processor

128MB SDRAM • 12.0GB Ultra ATA/66 HD

DVD-ROM • 2 FireWire® ports

Item #CPU1581

\$3499

Lease It for \$102/mo.*

FREE!*
64MB RAM UPGRADE!

after rebate, when you purchase an Apple PowerBook! Ask for item numbers #AAP1124 and INSTL10. Installation fee required.

*Free 64MB RAM Upgrade AFTER MacWarehouse \$100 mail-in rebate. Price before rebate is \$129.95. Installation fee of \$29.95 required. Visit www.warehouse.com/rebate/macwarehouse for mail-in rebate coupon or call us at 1-800-390-0706 to request one. Offer not valid on purchase of 350MHz iMac, or any reconditioned iMac. MacWAREHOUSE reserves the right to terminate this offer at any time. Offer expires 6/30/2000.

120MB USB SuperDisk Drive



Only **\$129.99!**
after rebate

Item #DRI3350

- Reads and writes 3.5" floppies
- USB & Hot-Swappable!

120MB SuperDisk Media 10-pack, only \$69.90** (only \$6.99 ea.), #BND3239.

*Price AFTER manufacturer's \$20 mail-in rebate. Before rebate: \$149.99. Rebate expires 6/30/2000.

**Price AFTER manufacturer's \$30 mail-in rebate on 10-pack. Before rebate: \$99.90. Rebate expires 6/30/2000. Rebate coupons are available at www.warehouse.com/rebate/imation or call 1-800-390-0706 to request them.

Targus Universal Notebook & Printer Case

Only **\$69.95!**

Item #AC28478



- Two individual padded compartments that measure 11" x 13" x 2.5"

PowerBook G3 Battery

As low as **\$139.95!**

Item #ACC3728

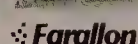
- Lithium-Ion

ACC3728 (fits new 1999/2000 models), only \$139.95
ACC3307 (fits 1998 models) shown, only \$199.95

Farallon FastEther 10/100 Adapter

Only **\$45.99!**

Item #DEC3194



- 10 times the bandwidth of 10Base-T Ethernet.
- Auto-negotiate to achieve maximum speed or backward compatibility with older devices.

Fast Ether TX 10/100 PCI Ethernet Card 5-Pack, only \$219.99, item #DEC3195.

FireWire 2 Go

Add FireWire to your PowerBook G3!



Only **\$119!**

Item #DRI3505

Fits in CardBus slot

NEW SPECIAL EDITION iBOOK

- 366MHz PowerPC G3 processor
- 64MB SDRAM • 56K modem
- 6.0GB Ultra ATA/66 hard drive
- 24X max. variable CD-ROM
- Integrated ATI RAGE Mobility 2D/3D Graphics Controller with 2X AGP
- Supports Airport™ wireless networking (Airport Card and Base sold separately)

Apple iBook 366MHz G3

\$1799!

Lease It for \$52/mo.*

Item #CPU1579

FREE*
64MB RAM!
after rebate. Installation fee required. Ask for item numbers #AAP1113 and INSTL10.

Cool graphite color!



NEW 300MHZ iBOOK G3

- 300MHz PowerPC G3 processor
- 64MB SDRAM • 56K modem
- 6.0GB Ultra ATA/66 hard drive
- 24X max. variable CD-ROM
- Integrated ATI RAGE Mobility 2D/3D Graphics Controller with 2X AGP
- Supports Airport™ wireless networking (Airport Card and Base sold separately)

Apple iBook 300MHz G3

\$1599! ea

Lease It for \$47/mo.*

Blueberry: #CPU1577 Tangerine: #CPU1578

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POWERBOOK G3 PC100 MEMORY

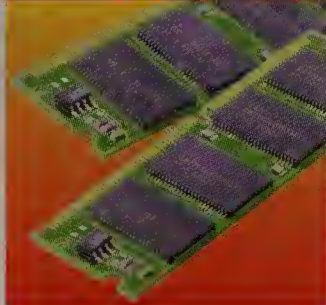
- New PC100 100MHz memory upgrades for 400MHz and 500MHz G3's

128MB PowerBook G3 Memory

\$249.95! each

Item #CHP1065

Memory prices subject to change.



AIRPORT CARD & STATION

- Transmits up to 150 feet
- Speeds up to 11MB per second

AirPort Card for iBook, only

\$99!

Item #DEC4142

AirPort Base Station for iBook (shown) Item #DEB2777 \$299

Wireless Internet Access!



*Free 64MB RAM Upgrade AFTER MacWAREHOUSE \$100 mail-in rebate. Price before rebate is \$129.95. Installation fee of \$29.95 required. Visit www.warehouse.com/rebate/macwarehouse for mail-in rebate coupon, or call us at 1-800-390-0706 to request one. Offer not valid on purchase of any reconditioned computer. MacWAREHOUSE reserves the right to terminate this offer at any time. Offer expires 6/30/2000. Rebate coupons are available to business customers with approved credit on product orders where at least one product totals \$750 or more. Payments are based on a 48-month Lease. Other leasing terms available. Leasing terms subject to change without notice. Call for complete details.

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NEW!

MacWAREHOUSE

Adobe Illustrator 9.0

Apple • 3Com • Global Village • Maxell • Mitsubishi • Iomega • Microtek

Olympus C-2020 Digital Camera

New Low Price!
Was \$899.95:
Now only
\$699.95!

Item #IN8346

OLYMPUS

- 2.1 Megapixel
- 3X optical zoom • 1600 x 1200 ppi resolution
- QuickTime movie mode (up to 60 seconds)

Olympus P330 Stylus Photo Printer, ask for item #PR14784, only \$399.95

64MB SmartMedia Cards

Only \$159.95!

Item #MY12482

- Digital film for digital cameras
- Compatible with new digital cameras with SmartMedia slot

Microtek ScanMaker 4

Only \$599.95!

Item #VW60199

- 36-bit color
- 600 x 1200 dpi
- Built-in transparency & slide bay
- 8.5" x 14" scanning area

Snaptrans templates included in Box!

MICROTEK

Imation CD-Recordables

Only 79¢ each, in 100-pack

Item #ME8572

While supplies last!



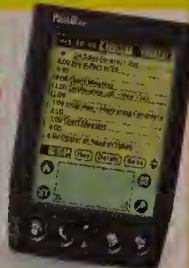
IMATION 3M

Palm IIIxe Connected Organizer

Only \$249!

Item #BND3834

- 8MB of memory
- 2MB Flash



PAGE 7 OF 8



Apple 350MHz iMac

Only \$899!*

Item #RCPU1492

RECONDITIONED

WHILE SUPPLIES LAST!

Blueberry, shown.

- 350MHz PowerPC G3 processor
- 64MB SDRAM (512MB max.)
- 6.0GB Ultra ATA/66 hard drive
- 24X max. variable CD-ROM
- 56K modem
- 15" color monitor
- 512K Backside Level 2 Cache
- 10/100 Base-T Ethernet
- Two USB ports



*Reconditioned system. Reconditioned computers may not include original application software. 90 day parts and labor warranty. All sales final. While supplies last. Free memory offer does not apply.

Apple iMac 400MHz DV

Only \$1199!*

- 400MHz • 64MB SDRAM • 10.0GB Ultra ATA/66 HD
- 4X DVD-ROM • 56K modem • 15" monitor
- Two Firewire Ports • iMovie Software
- Two USB Ports



Blueberry: #RCPU1493 Grape: #RCPU1494
Lime: #RCPU1496 Strawberry: #RCPU1495
Tangerine: #RCPU1497

Apple iMac DV Special Edition

- 400MHz • 128MB SDRAM • 13.0GB Ultra ATA HD
- 4X DVD-ROM • 56K modem
- 15" monitor • iMovie Software



Graphite only \$1299!*

Item #RCPU1498



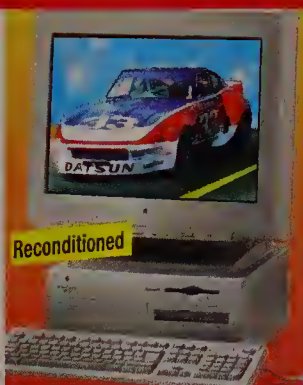
POWER MAC 7200/90MHZ

- 90MHz PowerPC 601 processor
- 16MB RAM • 500MB HD
- 4X max. variable CD-ROM
- 3 PCI Slots

Only \$399!*

Item #RCPU1471

*Reconditioned system. Reconditioned computers may not include original application software. 90 day parts and labor warranty. All sales final. While supplies last. Monitor and keyboard not included. Free memory offer does not apply.



iBook G3 300MHz

- 300MHz PowerPC G3 Processor
- 64MB SDRAM • 3.2GB HD
- 24X max. variable CD-ROM
- 56K modem • 1 USB port

Only \$1199!*

Blueberry: Item #RCPU1463

Tangerine: Item #RCPU1464

*Reconditioned system. Reconditioned computers may not include original application software. 90 day parts and labor warranty. All sales final. While supplies last. Free memory offer does not apply.



DIAMOND PRO 900u 19" MONITOR



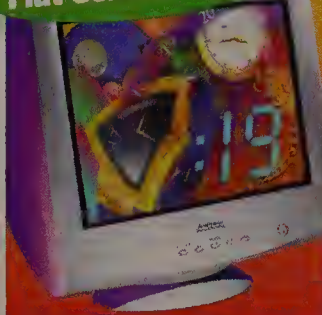
MITSUBISHI

- 1600 x 1200 @ 75Hz
- 18" viewable image size
- .25 aperture grille
- Manufacturer's 3-year warranty

Only \$637.95!

Item #MON0765

Flat Screen CRT!



VIEWSONIC P810 21" MONITOR

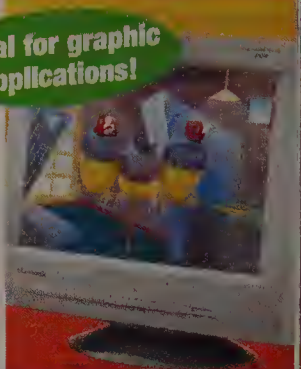


Ideal for graphic applications!

- 21" monitor (20" viewable image size)
- 1800 x 1440 @ 73Hz
- .25mm dot pitch

Only \$828.95!

Item #MT3320



FREE Jaz cartridge carry case with 3-pack purchase. #AA1753

Jaz 2.0GB Cartridges

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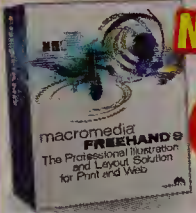


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APS ST 9.1GB Ultra160 LVD	10000	369.95	439.95
APS I 18GB Ultra160 LVD	7200	399.95	469.95
APS ST 18GB Ultra160 LVD	7200	399.95	469.95
APS I 18GB Ultra160 LVD	10000	629.95	699.95
APS ST 18GB Ultra160 LVD	10000	599.95	669.95
APS ST 36GB Ultra160 LVD	10000	899.95	969.95
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* Internal configuration does not include a mounting bracket. Intended as a replacement internal SCSI drive.



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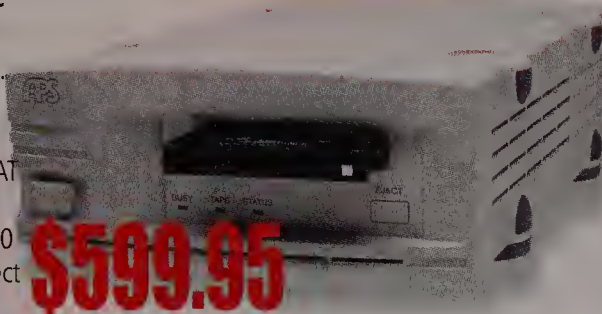
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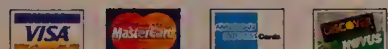
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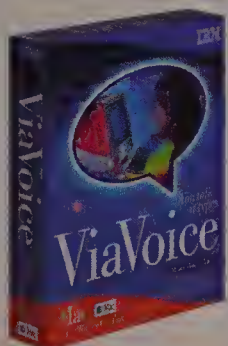
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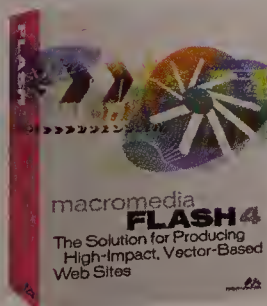
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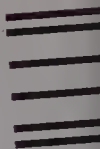
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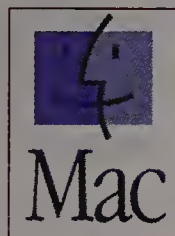
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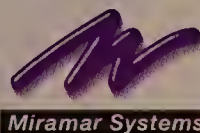
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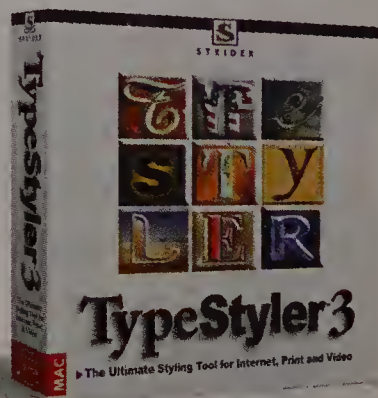
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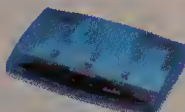
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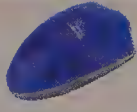
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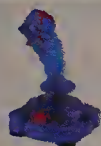
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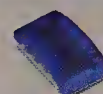
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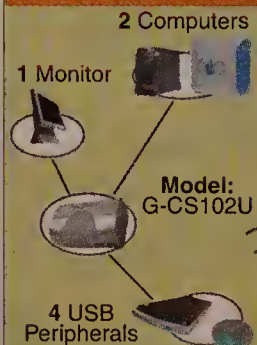


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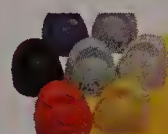
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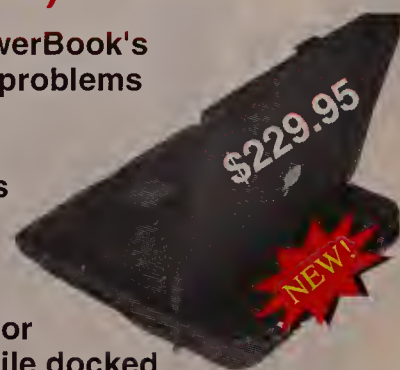
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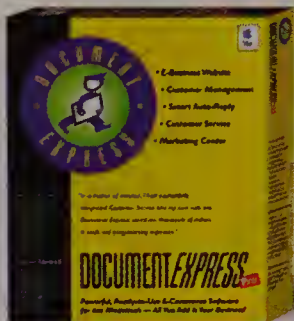
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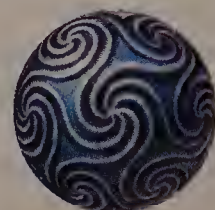
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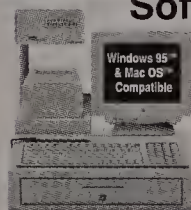
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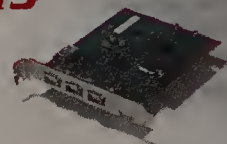
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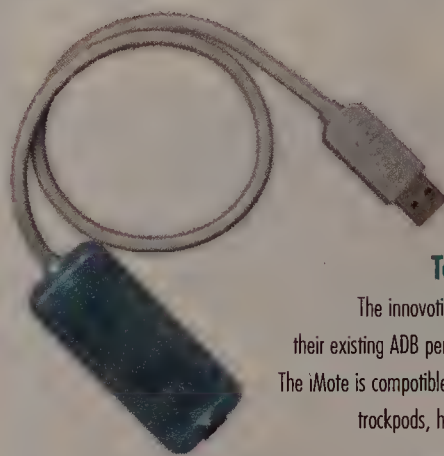


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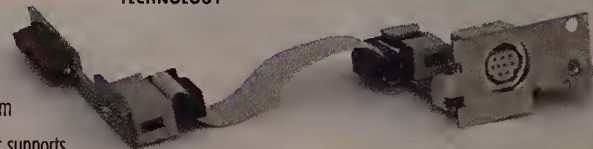
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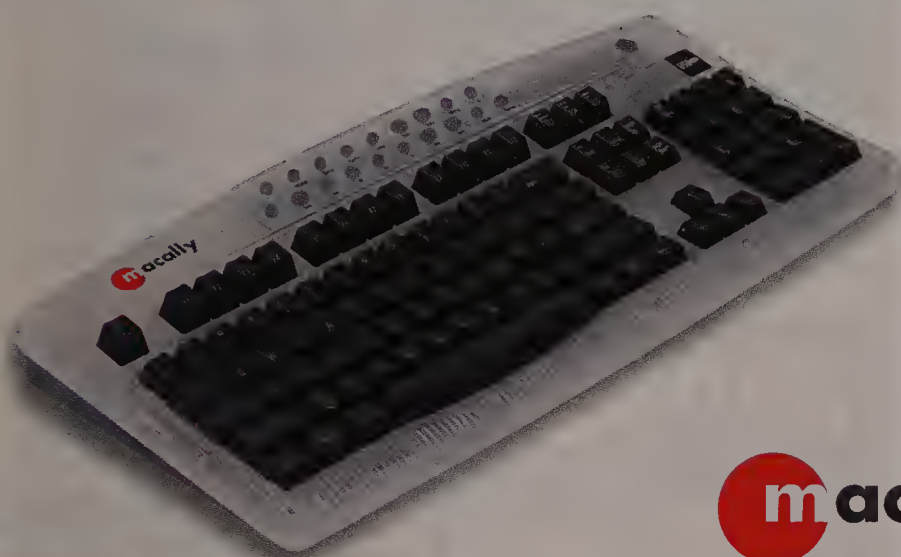
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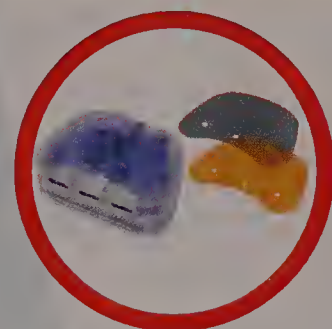
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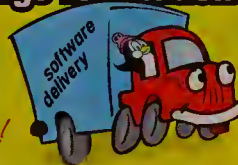
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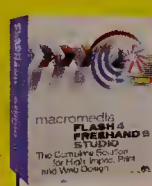
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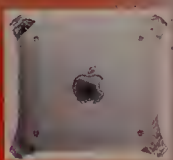
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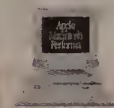
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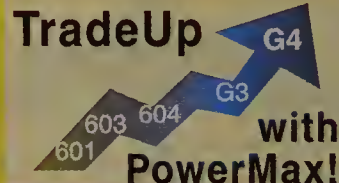
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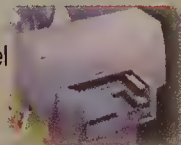
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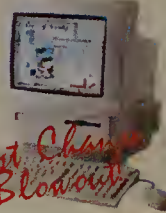
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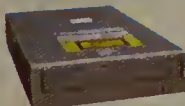
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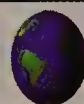
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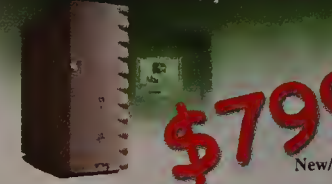


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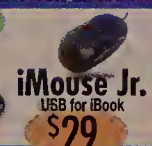
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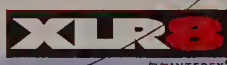


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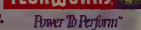
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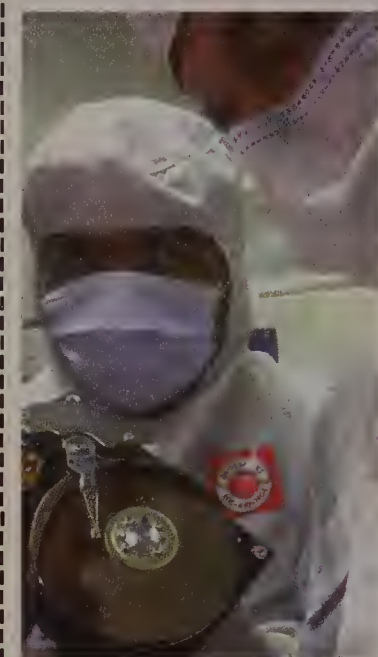
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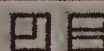
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The Desktop Critic

by David Pogue

Real Estate Breakers

WHEN IT COMES TO CLEVER PIXEL CONSERVATION, GUESS WHO'S DOING IT RIGHT?

THE FIRST MAC, AS those of you older than 21 may recall, had a 9-inch screen. The standard screen size has crept upward over the decades, but even today, the most common Mac screen size is only 15 inches, like the one on the iMac. Considering all the palettes, button bars, and control panels today's software requires, that's not a lot of real estate.

For years, Apple has led the industry in clever ways to conserve screen acreage. To pack hundreds of options in very little space, Apple excelled at designing interface elements that work like *drawers*—you click on something to pull open a much broader menu of choices, which closes up when you're done. So many Mac OS elements work this way: pop-up windows, contextual menus, flippy folder triangles, topic buttons on the Launcher, the Apple menu, and the Control Strip (which is like drawers *within* a drawer).

Good screen-saving ideas come from other software companies, too. Adobe has helped make collapsible, dockable palettes a standard feature in graphics software. Microsoft Word 5 popularized icon bars on the Mac. And years ago, the creators of FileMaker were apparently the first to notice that a computer screen is wider than it is tall—and that therefore the best place to put administrative junk like tool palettes is at the *side* of the screen, where they don't eat up your document space.

Unfortunately, Apple's software designers now threaten to undo all of their predecessors' good work. As I noted last month, the prototype of Mac OS X lacks most of the OS's "drawer" features. Then there's AppleWorks 6, whose list of shortcomings has been well documented online (at macintouch.com, for example): it's slow, comes with no user manual, and can't import or export Word files. But for

my money, its biggest flaw is the way it hogs real estate. Can anyone explain, for example, why the AppleWorks toolbox icons had to bloat from 55 pixels wide (in AppleWorks 5) to 80? The toolbox palette alone now guzzles 10 percent of an iMac's screen width (or 16 percent at 640 by 480 pixels) and shoves your document into a smaller part of the screen.

There's a customizable button bar, too; in AppleWorks 5 it was successful because it so deeply respected screen space. For example, you could drag it to any edge of your screen or rip it off into a palette you could park anywhere. In AppleWorks 6, however, all of those features are gone. Instead, you get one

improvement over a menu? A button bar you have to scroll is like a car you have to pull around on a trailer.

Now, I get angry letters from readers whenever I say something nice about Microsoft. But lately Microsoft has been bending over backward to respect and conserve screen space. Witness Internet Explorer 5: with a single keystroke, you can hide *all* the bars—button, status, Favorites, and otherwise. Nor is Microsoft finished with its mission to maximize screen space: the next versions of Word and Excel for the Mac, says the company, will each open with only *one* tool bar.

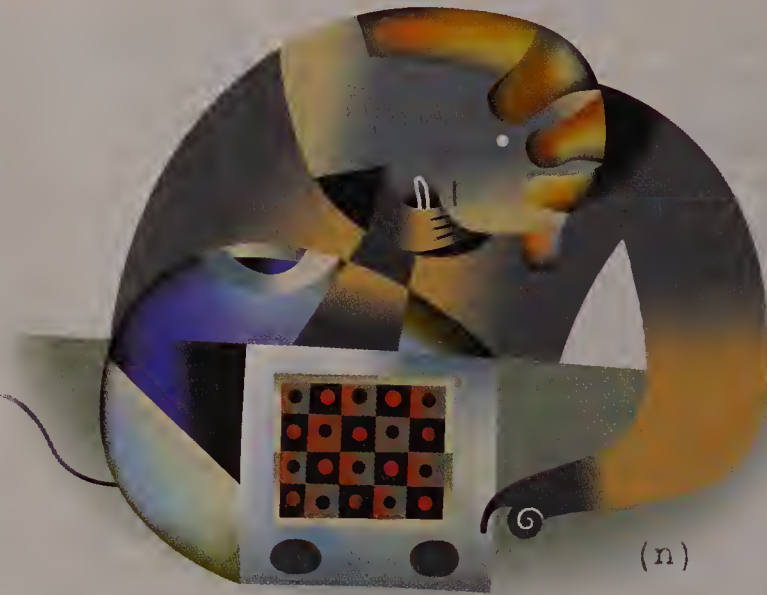
It wasn't always thus. I can remember making fun of Microsoft in this very col-

umn for the bungled design of Word 6, which opened so many tool bars that your document window huddled in one corner of the screen. But it's funny how a company's mood and fortunes affect its determination to do things right: the higher Apple flies, the less it seems to care about how much trouble its software design causes us. Meanwhile, as Microsoft flails in

court and in the public eye, it hunkers down, conducts user studies, and becomes paranoid about pleasing us.

Then again, maybe Apple's carelessness about screen space, and Microsoft's new space-saving religion, have nothing to do with their moods and fortunes. Maybe it boils down to a much simpler fact: of the two companies, only one profits from the sale of bigger monitors. **m**

DAVID POGUE (www.davidpogue.com) is the author of the just released *iMovie: The Missing Manual* (Pogue Press/O'Reilly, 2000).



rigid, jumbo button bar you can't resize or reshape as a palette to make better use of your screen.

Furthermore, Apple is doing a lot of icon-enlargement surgery these days, whether in Mac OS X or AppleWorks 6. Fewer of these supersize icons fit the AppleWorks 6 button bar. So how does AppleWorks 6 handle the overflow? It adds *scroll bars* to the button bar. Scroll bars?! The entire purpose of a button bar is to keep commonly used functions on the screen at all times! If a button bar hides some of its commands, how is it any

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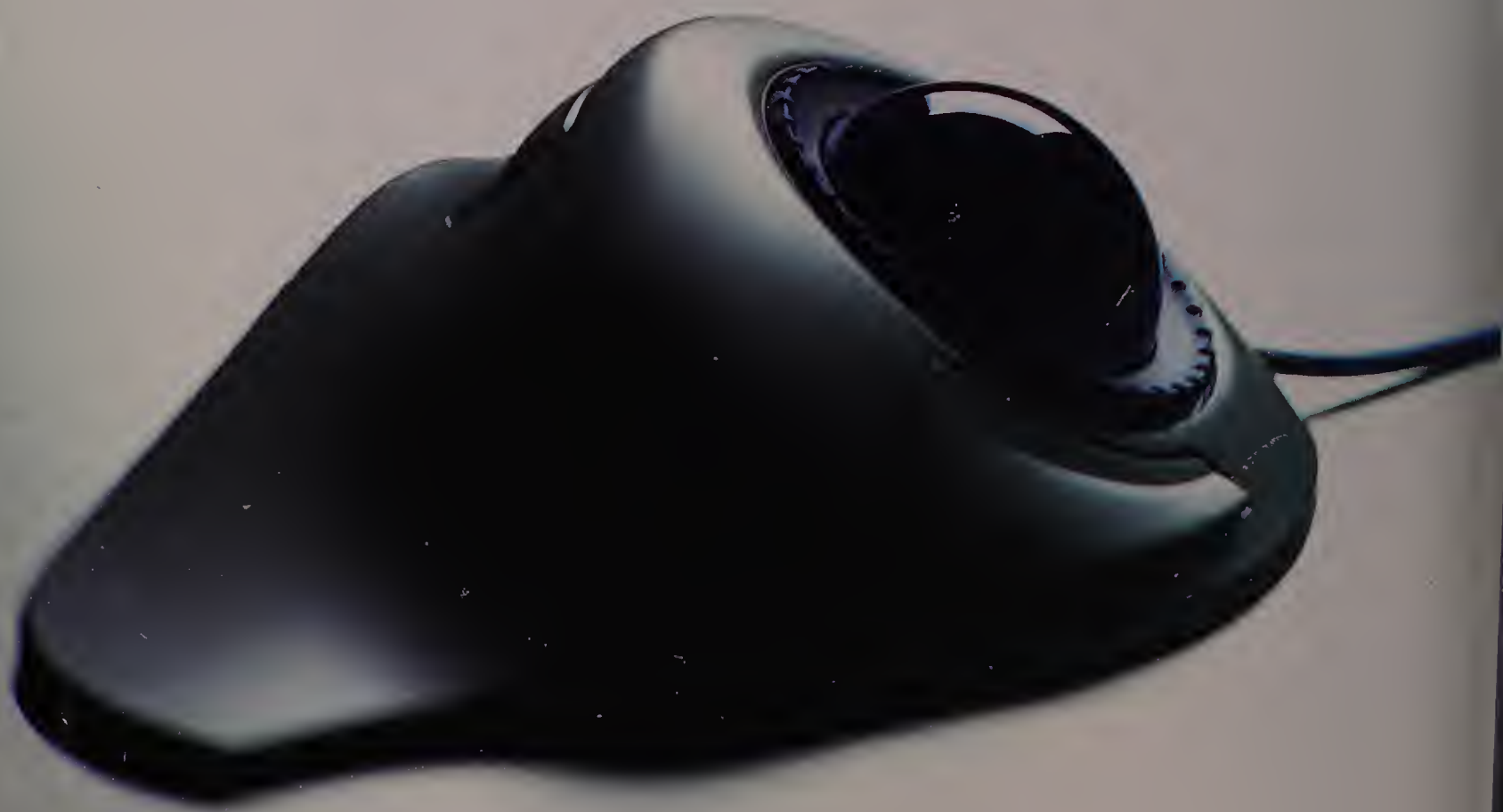
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